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Pathology user guide 2013

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Introduction

The guidance in this handbook has been written as a guide for all users of The Queen Elizabeth Hospital, King's Lynn Pathology services to enable clinical staff to make the best use of our Pathology services. Should you have queries with regard to any aspect of the service; staff members will be pleased to discuss these with you.

Histopathology, Blood Sciences, Transfusion and Microbiology Laboratories are accredited by CPA and we regularly update our facilities and equipment. We welcome enquiries to visit our laboratories.

This handbook builds on earlier issues with amendments to inform on changing service developments. The authors would welcome comments and suggestions for the next edition.

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For details of other Senior Pathology Staff please see first page of each Departmental section

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Table 1

QEH King's Lynn Pathology Telephone numbers

All QEH King's Lynn numbers can be telephoned externally by dialling: 01553 61 and then the 4-digit number

Dr. Lisa Cooke **Director of Pathology 3401**	

GENERAL

		Phone	Bleep
Reception		3769	
Phlebotomy room		2882	
Jane Thompson	Phlebotomy Supervisor	2882	1216
Phlebotomist	On wards		1216, 1263, 1265
Audrey Hudson	Stores	2794	
Pathology Computer issues	IT	4422	
Apex Passwords	Via email	Email	
Pathology Website:	Via Communications		

BLOOD SCIENCES combined Laboratory

Blood Sciences Enquiries line	3771 / 3779

BLOOD SCIENCES & TRANSFUSION

		Phone	Bleep
Biochemistry Lab	Main Lab	3490	
Haematology Lab	Main Lab	2079	
Transfusion	Main Lab	3782	
Richard Pipkin	Blood Sciences Mgr	3430	
Stephen Thompson	Deputy BS Mgr	3561	
Chris Brock	Quality Manager	3561	
Kirsty Bunting Lewis	Training Officer /Auto lead	4615	
Adrian Ebbs	Transfusion Mgr	3782	
Denise Clout	Deputy Transfusion Mgr	3782	
Locum	Consultant Haematologist	3609	3609
Dr. AJ Keidan/PB Coates	Consultant Haematologist PT		
Dr. M Lewis	Consultant Haematologist	3401	2893
Dr. L Cooke	Consultant Haematologist	3030	3030
Dr. E Gudgin	Consultant Haematologist	3621	3621
Specialist Registrar			2892
Vacant	Consultant Chem. Path		
Maggie Pate	Secretary (ACS)	3797	
Mandy Caldwell	Secretary (LC/EG)	3299	
Maureen Phillips	Secretary (Locum/New Cons)	3684	
Sasha Munnelly	Secretary (ML)	3702	
Lisa Robinson	Secretary (LC/EG)	3329	
Claire Atterbury	Transfusion CNS	2620	2795
Jane Miller / Ruth Overton / K Whicker	Haematology Sisters	2795	1277
Lizzie Macleod-Collins / M Padget /	Anticoagulation Sisters	2798 / 2195	3355
Pat Fysh	Anticoagulation Assistant	3355	
Sam Fairless	Transfusion Admin	3561	
David Pemberton	Point of care Manager	3599 (9am-5pm)	

MICROBIOLOGY / VIROLOGY

		Phone	Bleep
Micro Lab	Main Lab	3772	
Graham Rogerson	Lab Manager & Micro & Cell Path computer Mgr	2876	
Prof L Liebowitz	Consultant	3627	3627
Dr S Sharma	Consultant	4360	
	Infection Control		
Lynne Roberts	Inf. Control Nurse	2326	2326

CELLULAR PATHOLOGY
Histology, Cytology, Mortuary.

		Phone	Bleep
Histology	Enquiries	3617	
Ann Hennessey	Lead BMS	3431	
Mike Davies	Senior BMS	3617	
Jeff Smith	Senior BMS	3617	
Vacant/Locum	Consultant	3622	
Dr. L Ranasinghe	Consultant	3624	
Dr. Phuoc-Tan Diep,	Consultant	2483	
Dr R Ahmed	Consultant	3624	
Dave Spooner	Mortuary Lead	2561	
Relative Support		3878	
CYTOLOGY			
Cytology	Enquiries	3020	
Lynne Macmillan	Senior BMS	3020	

IMMUNE SCIENCES / ANDROLOGY

Karen Ashurst	Lead Scientist	3207	

PATHOLOGY FAX NUMBERS

PATHOLOGY	01553 613955
BLOOD SCIENCES &TRANSFUSION	01553 767742
MORTUARY	01553 613266
CELLULAR PATHOLOGY	01553 613070

E-MAIL: Pathology staff can be e-mailed at: forename.surname@qehkl.nhs.uk

Pathology Reception Opening Hours

The Pathology Reception is open for receipt of specimens at the following times:-

Monday – Friday Reception: 08:00 – 17:00

General enquiries can be made by phoning: 01553 613769

The Phlebotomy (blood taking) suite is open for outpatient and GP phlebotomy from 08:15 – 17:00 hours Monday to Friday. It is located on the ground floor of the Pathology Department of the Hospital. Patients with pre booked appointments for Glucose Tolerance Tests and other pre booked Clinical Chemistry tests are seen from 08:15, with up to 3 patients booked in for 08:15 and 2 booked in for 08:45. There is no outpatient phlebotomy provision at the weekends.

GP Information

The Pathology department is open for receipt and processing of routine specimens during the hours as shown in table 2. Please consult the Pathology telephone directory (table 2) for departmental telephone numbers.

Table 2

Site / Department	Monday - Friday	Saturday Sunday/Bank Hol.
Reception	08:00 – 17:00	Closed
Haematology and Transfusion	08:00 - 18:00	Out of hours policy applies
Chemical Pathology	08:00 - 18:00	Out of hours policy applies
Microbiology	09:00 - 17:00	Out of hours policy applies
Histology	07:30 - 17:30	N / A
Cytology	07:30 - 17:30	N / A
Mortuary	07:30 - 1630	See on call policy for Mortuary
Semen Analysis	Tuesdays, Wednesdays and Thursdays	N / A

Information for hospital users

The Pathology Department is open for receipt of samples at the times shown in table 3. Please note the conditions for processing of samples outside of normal office hours and for processing of urgent samples at any time:

Table 3

Site / Dept	Mon - Fri	Sat/Sun/BH	Urgent samples (Normal hours)	Outside hours
Reception	08:00 - 17:00	Closed		
Haem and Bl. Trans	08:00 - 18:00	08:00 - 12:00	Phone 3779	Contact Haem BMS via Switchboard
Chemical Pathology	08:00 - 18:00	08:00 - 12:00	Phone 3771	Contact Bio BMS via Switchboard
Microbiology	08.30- 16.30	09:00 – 11:00	Phone 3772	Contact Micro BMS via switchboard
Histology	07:30 - 17:30	N/A	Phone 3617	Contact switchboard
Cytology	07:30 - 17:30	N/A	Phone 3020	N/A
Mortuary	07:30 - 17:30	Contact via Switch board	N/A	Contact via Switch board

Services provided

Ground Floor

The laboratory and Mortuary are located at the rear of the QEH

The following services are provided on the ground floor:

- Blood Transfusion
- Chemical Pathology
- Haematology
- Immune science
- Phlebotomy
- Anticoagulation Office
- Reception
- Mortuary
- Semen analysis

Upper Floor

The following services are provided on the Upper Floor:

- Cytology
- Histology
- Infection Control
- Microbiology

Results and Requests

General

It is essential that the request form is correctly and legibly completed with the following information:

- Patient's Surname and Forename
- Hospital Number (if known).
- Date of birth
- Gender
- Location
- Consultant or GP
- Requesting doctor (plus bleep number if applicable)
- Relevant clinical information, including date of onset for serology/virology requests
- Date and time of sampling
- Tests requested.

All samples must be appropriately labelled with:

- Patient's Surname and Forename
- Hospital Number (if known)
- Date of birth
- Date and time of sampling

All samples must be labelled with labels generated by the PDA system within the Trust, except from those areas with prior agreement with the laboratory, where the system has not been fully installed. Samples from Primary Care should be labelled using the GP's own system, and all labels should be applied perpendicularly on the specimen tube.

Unacceptable Specimens.

Labelling details on the specimen must match the details on the request form, and enable unique identification of the patient. (Surname, forename, DOB and Hospital number if known)
The request form must be fully completed.
Specimens must be placed in the appropriate bottles or transport media.
Specimens must be transported to the laboratory in reasonable time.
Specimen containers must be sterile, properly sealed and not leak

Any specimen which does not meet the above criteria will be referred to the senior BMS present and will normally not be processed, unless a repeat specimen cannot easily be obtained. Interpretation of any results from such specimens must be made with extreme caution.

Specimen Collection

General

All biological samples represent a potential health hazard to healthcare staff. Please ensure that specimens are properly sealed before transportation to the laboratory. Leaking or contaminated samples must not be sent to the laboratory. Drivers and porters must follow the model rules as described in the Laboratory Transport Policy.

Phlebotomy Services – Outpatient and GP

A phlebotomy service is provided at the Queen Elizabeth Hospital. The Phlebotomy (blood taking) suite is open for outpatient and GP phlebotomy from 08:15 – 17:00 hours Monday to Friday. It is located on the ground floor of the Pathology Department of the Hospital. Patients with pre booked appointments for Glucose Tolerance Tests and other pre booked Clinical Chemistry tests are seen from 08:15, with up to 3 patients booked in for 08:15, and 2 booked in for 08:45.

Booking system for pre-booked Phlebotomy: Health care professionals who need to book their patient for GTT should phone extension 3769 in the first instance.

We operate a queuing system for patients attending for phlebotomy based on sequential ticketing. Patients (except those attending the Warfarin clinics) would be instructed by sign display to collect a ticket from the dispenser attached to the wall adjacent to the reception window. The phlebotomist will 'call' in the patient by displaying the accession number on the display that is situated next to the phlebotomy suite clinic room 1 door.

Outpatients, with the exception of children under 4 years, may attend Pathology for phlebotomy.

Children under 4 years will be directed to Rudham ward (first floor, rear of QEH) for phlebotomy.

Location: Ground Floor Pathology department

Times: Mon – Fri 08:15 – 17:00

Phlebotomy Services – Wards

A full service in respect of ward phlebotomy requirements is offered on a daily basis starting at 08:00 each day. This service is also offered on weekends and bank holidays, but is restricted to a limited number of hours. **Please do not abuse the service by placing requests for non-urgent bloods on the weekend.** In the event that the demands for weekend phlebotomy are over-subscribed the phlebotomy team have been instructed to request that the ward staff prioritise the requests.

Anticoagulation service

Anticoagulation Referrals – Please phone 3355
Anticoagulation Advice - Please phone 2798 / 2195 bleep 3355

Role

- To act as a source of expertise and knowledge for both patients and other health care professionals. The post holders will be aware of current clinical research protocols, investigations and procedures employed in the diagnosis and treatment of clotting disorders and anticoagulation dosing protocols.
- To work in collaboration with other hospital staff and community anticoagulation services to provide the highest possible standard of care and support to patients who are on anticoagulation therapy and their families.
- To organise the provision of a comprehensive nurse led service for patients who are on anticoagulation therapy and to provide advice with regard to coagulation queries for staff, patients and other healthcare professionals.
- To undertake a lead role in the promotion and development of anticoagulation services across the primary/secondary interface
- Nurse prescribing duties as independent/supplementary prescriber is undertaken by the Coagulation Nurse Specialist.

There are now five GP based anticoagulation clinics – St James Medical Practice, Gayton Road Health Centre, Bridge Street Surgery in Downham Market, Fakenham Surgery and the Suttons Medical Centre. Additionally, two community based anticoagulation services – Swaffham Community Hospital covering the Swaffham and Heacham surgery areas and the Fenland Anticoagulation Nursing Service who cover the Wisbech and Fenland area.

There are currently 5 members in the Queen Elizabeth Anticoagulation team and clinics are held daily. Patients new to warfarin therapy have an INR blood sample taken either in Pathology at QE or NCH or the district nurse takes the blood sample for patients too ill to attend. The INR result is reviewed by the Nurse Specialists, who then dose the warfarin and arrange the date of the next test, phoned to the patient by the anticoagulation assistants. Once the patient's INR has stabilised they are transferred to either the main anticoagulation clinics or to the community clinics for monitoring of their anticoagulation therapy. Patients who attend the main anticoagulation clinics, held daily, have a capillary INR blood sample taken and are then dosed manually or by a computer dosing system. The computer dosing system enables the anticoagulation assistants and laboratory technicians, working within agreed protocols, to dose warfarin therapy for patients.

Patients who are due for review of the duration of their warfarin therapy are seen in clinic by one of the Coagulation Sisters. The decision to stop therapy is based on the reason, if any, for the Venous Thromboembolism (VTE), previous and current medical history, if symptoms have resolved, and the agreement of the patient. Any patients with difficult histories are referred to the Consultant Haematologists.

Patient leaflets have been produced by the Coagulation Nurse Specialist and Deep Vein Thrombosis (DVT) Sister to help patients understand their condition, why they are on anticoagulation therapy and how it works.

A nurse led DVT clinic is now held on a daily basis. This has relieved resources for MAU and is of benefit to patients as one person now cares for them from initial consultation to diagnosis or exclusion of DVT.

Contacts:

Anticoagulation Sisters:	Phone / bleep	2798 / 2195
Pat Fysh - Anticoagulation Referrals:	Phone	3355

Handling and Labelling Danger of Infection Specimens

1. It should be confirmed on the request form that appropriate counselling has been given and consent obtained from the patient before samples for HIV testing are despatched to the laboratory.
2. All high risk, Danger of Infection samples (e.g., Hepatitis B or C, HIV, TB, etc) samples must be identified with the use of a high-risk label (yellow & black "Danger of Infection" label) and double-bagged in the approved plastic bags.
3. Each specimen must be accompanied by a request form which must also be highlighted with a high risk label
4. The bags should also be high lighted with a high-risk label.

Ward/clinic/department staff are responsible for ensuring an adequate supply of labels are made available.

Availability of clinical advice and interpretation

Interpretation of the results of laboratory tests and clinical advice is always available and is provided by the Departmental Consultants as shown in table 4.

Table 4

Dept	Consultant contact	Availability	How to contact	Email
Clinical Chemistry	Vacant		Ext. 3797 or via switchboard	
Haematology	On Call Consultant	24/7	Via switchboard	
Microbiology	Dr L Liebowitz Dr S Sharma	24/7	Ext. 3627 (LL) 4360 (SS) or via switchboard	lynne.liebowitz@qehkl.nhs.uk sunil.sharma@qehkl.nhs
Cellular Pathology		08:00 - 17:30	Ext. 3622	

Urgent Requests (instructions for Trust requesters)

Chemical Pathology / Haematology service (Blood Sciences):

Normal working hours:	Mon - Fri	08:00 to	18:00	
	Weekends:	09:00	to	12:00 (Midday)

The Pathology Reception is manned Mon – Fri between 08.15 and 17.00hrs, so there is no need to page the Biochemistry or Haematology BMS. Within the hospital, samples may be sent by air tube or porter.

Please note that samples for blood cultures, blood gas analysis and Danger of Infection must not be sent by air tube.

In the event of the air tube system being down, the portering system should be used for delivery of all samples.

The laboratory aims to analyse and report results within the working day for most routine requests.

Urgent requests are reported within a maximum of 2 hours from receipt in the lab.

In circumstances dictating a faster turnaround time, e.g. patient bleeding in Theatre, please phone the appropriate lab (Ext 2330 (Transfusion) or Ext 3771 (Blood Sciences)) or page the relevant shift staff outside hours (via Switchboard) to arrange immediate action.

During normal working hours **phone 3771 / 3779** to expedite test results if they are not available within 2 hours of booking on the laboratory computer.

Outside hours:	Mon - Fri:	18:00	to	08:00
	Weekends:	24 hour cover on Saturday/Sunday		

The Biochemist and Haematologist on-call will pick-up samples deposited in the laboratory fridge by porters every 2 hours and analyse and report these within the hour. There are scheduled runs at 6pm, 8pm, 10pm, midnight, 2am, 4am, 6am.

There is **NO NEED** to page the on-call staff, unless the sample is for the immediate management of the patient (e.g. malaria, CSFs, massive blood loss, etc.)

Response times for urgent requests:

The target turnaround time between arrival in the lab and the reporting time of urgent requests, such as U&E, FBC is 2 hours. Current turnaround time is less than 1 hour for high dependency areas such as A&E, Medical Assessment Unit, Intensive Care Unit. Unexpected, grossly abnormal, life threatening results will be telephoned as soon as they are available (see telephoning policy).

Blood Transfusion requests **MUST** be bleeped to Haematology BMS in **every** event.

Urgent Requests (instructions for non-Trust requesters e.g. GPs)

Please ensure that any urgent sample sent to the laboratory is clearly labelled as such. Please advise us of urgent samples in transit by contacting us:

Blood Sciences:	01553 613771 / 613779
Microbiology:	01553 613772
Transfusion:	01553 613782

Please also ensure that you provide a contact number (direct line to surgery or personal telephone number) so that the results can be reported without delay (and often outside of normal surgery hours).

Instructions for the air tube system

The air tube systems are for the transport of pathology specimens to the laboratories. Ports are situated in the areas as shown in table 5.

Table 5

Location	Address
Emergency Department (A/E)	100
MAU	110
ITU	120
Stanhoe	234
Microbiology	222
Blood Sciences	211
GU clinic	456
Tilney	808
NICU/CDS	111

The air-tube system is **NOT** to be used for Danger of Infection samples (blood gases, blood cultures), or unrepeatable samples. Microbiology specimens must not be sent via the air tube after 21:00 hours. Please send all these samples by Porter instead.

Instructions for use of the air-tube system

1. Ensure that all samples and accompanying forms are sealed in transparent plastic bags. Place the sealed bag(s) containing sample & form in an air tube pod having checked that the lid is properly closed and that the pod is in good condition (no cracks or breaks).

2. Input the three-digit address of the target destination onto the keypad, e.g., for Blood Sciences it is 211

3. Place the pod into the carrier.

4. The pod should send to its destination.

If any defect is noticed with the operation of the air-tube system please notify the laboratory at the earliest convenience.

Results

Printed reports are returned to all wards and outpatients on a daily basis. For all GP practices, results are transmitted electronically.

Within the hospital, results are also available via the Pathology Ward Enquiry facility (Apex for all disciplines) as soon as they are validated. Please note that validated results in Haematology may be preliminary and can change prior to the issue of the final report.

Significantly abnormal results (see individual department's policy on telephoning results) will be telephoned to the requesting doctor, nurse or consultant's secretary as appropriate.

In general:
In all instances, the BMS will identify themselves; communicate which department and hospital they are telephoning from. The patients name and date of birth will be conveyed, along with the pertinent abnormal results. It will then be necessary for the results to be read back to the BMS to ensure that results have been exchanged correctly. The BMS will require the results to be read back to them to ensure that the results have been exchanged correctly. The BMS will require the name of the person receiving the results. It then becomes the responsibility of the person receiving the results to communicate them to the doctor in charge of the patient's care for clinical intervention if required.

Abnormal in-patient results: The Staff Nurse/Doctor on the ward will be informed that results are available on ward APEX terminals and an appropriate comment will be entered into APEX as a record.
Abnormal out-patient results: The requesting clinician's secretary will be telephoned with the abnormal results and an appropriate comment will be entered into APEX as a record.
GP (within surgery hours): The relevant GP surgery will be telephoned via the GP reception and an appropriate comment will be entered into APEX as a record.
GP (outside surgery hours): The relevant GP messaging service will be telephoned. The BMS will identify themselves, the department and hospital. They will request the duty GP to contact the BMS on-call for the results. Professional judgement will be used.
After 3 reasonable attempts to telephone results, the results will be authorised and left to be phoned the next day. There will be a record that attempts were made to contact the requester before the results are authorised. After the successful attempt, another record will be made and the original will be amended if necessary.

If the ward/GP/Secretary is not contactable the next day, the comment code NOTC = Not contactable will be entered into Apex and authorised

If the laboratory receives enquires relating to patient results the following information will be required:

1) Name, qualification and location of person calling. Results can only be given to persons authorised to receive it, normally the patients Doctor, Nurse or other Professional Healthcare Worker who is involved in the immediate treatment of the Patient.

2) Full Name, Date of Birth and Hospital number (if known) of the patient. Address may also be useful if it is a common name.

3) Details of what specimen was taken, what tests were requested, when the specimen was sent and by whom.

Please remember that many of the results are often complicated and assurance of understanding that the person who is being telephoned will be assessed. Results will not be given if the BMS has any doubts about the suitability of the person to receive results.

Procedure for accessing Pathology Ward Enquiry Facility

- From front screen choose 'Pathology'. This is usually option number '2' and press enter.

- At 'Login' prompt enter 'APEX' and press enter.

- At 'Unknown answerback' enter 'ZLN', 'PATH1' or 'PATH3'. (Some terminals may not ask for this and may go straight on to the next screen if left for 10 - 15 seconds.)

- Enter username and password when prompted. Entering your password incorrectly 3 times will lock you out and Pathology will have to rectify this. Passwords can be obtained from pathology. When first entering a new password you will be asked to change it from the one you were given to another word of 6 or more letters. **Passwords last for 3 months and can be renewed near the time of expiration at any terminal using the ' UPASS' option**. Usernames never expire.

- The front screen of APEX system should appear. You should have access to 'Ward Enquiry', 'Result Enquiry' and 'Change Password' only.

- To access patient results from the disciplines Biochemistry, Haematology, Microbiology and Transfusion enter 'Ward Enquiry' (WENQ).

- Enter patient's hospital number, press return and enter first 2 letters of the patient's surname and press enter.

- After patient details have come up press 'return' until the cursor is in the 'discipline' option. To see all results, from all disciplines, leave this blank (use the space bar to clear whatever discipline is showing) or enter C for Biochemistry, H for Haematology, M for Microbiology or T for Transfusion.

- Press return until cursor is at the bottom right of the screen with an A in it. Press return and this will accept these details, or to see a full list of all specimens type S and Press return twice.

- Move through different dates/samples using 'Page up' and 'Page down' (or 'Prev' and 'Next') on keyboard. Move through results from one day using up and down arrows on keyboard.

- To look at results over a period of time, find sample results of the necessary discipline and enter U in the bottom right of the screen. Press return.

- To exit out of any screen move to the bottom of the screen (by pressing 'return'), enter X and press 'return'. (Except in patient demographics screen of 'Ward Enquiry' where you simply move the cursor up using keyboard arrows until the page exits.)

Remember - always log out of system at the end of the session by pressing 'X' and 'return' at the main menu.

- Update your password using UPASS before it expires.

- Never allow anyone else to know your username and password.

Apex basic troubleshooting

If you cannot access Apex, exit the programme and re-select the icon on the desktop. If this fails to give access, reboot the PC and repeat the procedure. If this fails to give access, try from another PC on the ward/department or check with another ward/department to determine if the problem is localised or more wide-spread (Trust wide?)

If the problem is localised, report the failure to the Trust IT department helpdesk (ext 4422) or to the Site Co-ordinator (out of hours IT support via switchboard).

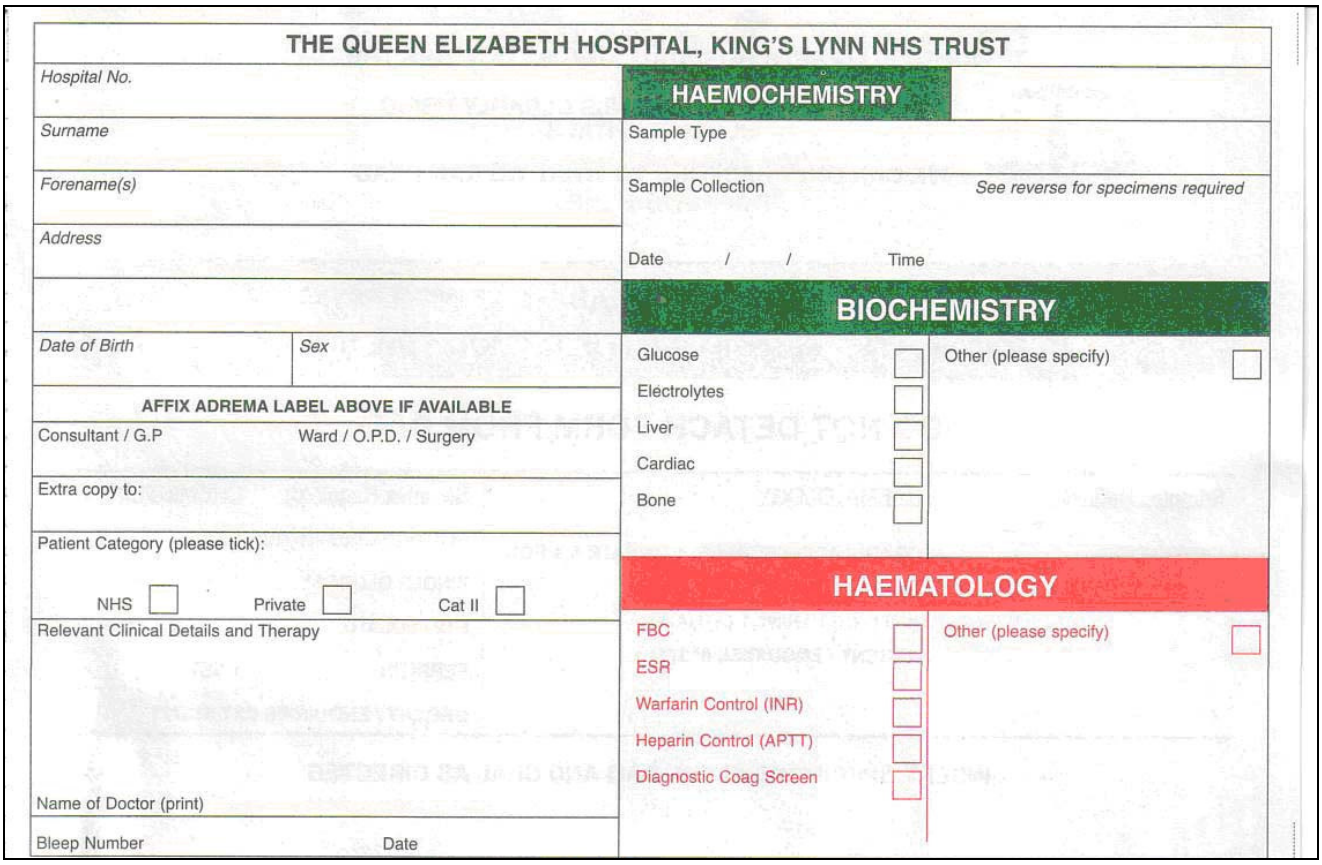
If the problem appears Trust wide, determine if the problem is a network problem (PAS system will also be down) or a specific Apex problem (PAS working normally). Network problems should also be reported to Trust IT on 4422. Specific Apex problems need to be reported to the Pathology IT Manager (ext 3430 in-hours) or the Haematology or Biochemistry BMS on call (via Switchboard) who will attempt to solve the problem.

Chemical Pathology

Request Form

The chemical pathology request form is combined with the haematology discipline as shown by figure 1.

Figure 1



THE QUEEN ELIZABETH HOSPITAL, KING'S LYNN NHS TRUST

Hospital No.

Surname

Forename(s)

Address

Date of Birth | Sex

AFFIX ADREMA LABEL ABOVE IF AVAILABLE

Consultant / G.P | Ward / O.P.D. / Surgery

Extra copy to:

Patient Category (please tick):

NHS ☐ Private ☐ Cat II ☐

Relevant Clinical Details and Therapy

Name of Doctor (print)

Bleep Number | Date

HAEMOCHEMISTRY

Sample Type

Sample Collection — See reverse for specimens required

Date / / Time

BIOCHEMISTRY

Glucose ☐
Electrolytes ☐
Liver ☐
Cardiac ☐
Bone ☐

Other (please specify) ☐

HAEMATOLOGY

FBC ☐
ESR ☐
Warfarin Control (INR) ☐
Heparin Control (APTT) ☐
Diagnostic Coag Screen ☐

Other (please specify) ☐

Care should be taken to fill in the form correctly. All details are essential and should be written in block capitals if patient demographic stickers are not available. Please enter sample type and date/time of collection, as well as pertinent clinical information. Please also state the requester and location you would like the results returned to.

Senior Staff

Senior staff and contacts within chemical pathology are detailed in table 6.

Table 6

Contact	Title	Phone Number
Vacant*	Consultant Chemical Pathologist	
Mr. Richard Pipkin	Blood Sciences Manager	3430
Mrs Maggie Pate	Secretary	3797
Results enquiries		3771
Out-of-hours :	Clinical advice*	Contact Consultant via Switchboard
	On-call BMS	Bleep via Switchboard

***Please note that when the Consultant Chemical Pathologist is not available, 24 hour cover is available via a service provided by the Cambridge University (Addenbrookes) NHS Foundation Trust. Please contact the QEH laboratory for further information QEH extension 3797)**

Sample requirements

A comprehensive list of available tests, with reference ranges, sample requirements and expected turnaround times is provided at the end of the Chemical Pathology section of this Handbook. The vast majority of biochemistry tests are performed on Becton Dickinson Gold Top (SST) tubes.

Quality Control

In order to maintain high standards of analysis this Department participates in national quality control schemes and maintains its own internal system of quality control checks. However, additional errors can arise from problems of sample acquisition and delivery (such as arise by poor bleeding technique, delays in transport, poor identification etc.) and equally as a result of errors in recording results transmitted by telephone. It is generally prudent to adopt a policy of thoughtful diligence in these processes. Examples are illustrated below:

- Do not use large tubes for small blood samples as this greatly reduces the volume of serum/plasma which can be obtained.

- Blood samples taken for estimation of potassium, phosphate and bicarbonate must reach the lab in timely fashion as delay compromises the validity of these tests. Prolonged retention of such samples, such as late acquisition leading to overnight retention, should be guarded against.

- Order of draw of blood samples. It is necessary to adhere to an order of draw, as some sample tubes have preservatives that might interfere with analyses. When using the Becton Dickinson vacutainer system, tubes must be filled in the following order to minimise contamination from tube additives:

  1 Gold top
  2 Heparin (green top)
  3 EDTA (purple top)

4 Fluoride (grey top)
5 Others

Never tip blood from one tube into another

Contact the department if any difficulties in interpretation occur and do not just ignore results, which cannot be explained or are thought to be erroneous.

Common Specimen Artefacts

Contact the department if any difficulties in interpretation occur and do not just ignore results, which cannot be explained or are thought to be erroneous.

Problem	Common Causes	Consequences
Delay in separation of serum or plasma	Delay in transit	High K^+, AST, LDH, Mg^{2+} Low Na^+ (occasionally)
Haemolysis	Expelling blood sample through a needle into specimen tube Over vigorous mixing of sample Sample stored in deep freeze Excessive delay in transit Sample left in hot place	High K^+ High phosphate (PO_4^{2-}) Low Na^+ and Cl^- High AST, LDH High Mg^{2+}
Incorrect container or anticoagulant	No enzyme inhibitor EDTA tube contamination Excess liquid heparin	Low glucose High K^+, Low Ca^{2+} Abnormal blood gases and analytes
Lipaemia	Taken before intra-lipid is cleared. Taken after fatty meals; anxiety and stress	Interferes with many due to turbidity of sample. May cause low Na^+
Contamination of blood by infused fluids	High MW dextrans Dextrose Crystalloid solutions	Elevated proteins High glucose Spurious Na^+, K^+, Cl, etc. Low Ca^{2+}, high Na^+
Bubbles in blood for arterial gases	Leaking syringe/needle junctions. Inadequate stoppering of syringe in transit.	Low pCO_2 Increased pO_2

Venous Blood

Specimens of venous blood should preferably be taken with the patient sitting or lying down and without prolonged venous stasis. Do not collect specimens from a vein in a limb into which an intravenous infusion is being given. If there is anticoagulant in the tube, mix by repeated gentle inversion – do not shake the specimen.

Patients with very high platelets or white cell counts may give spuriously high serum potassium levels and should be checked on lithium heparin plasma (green top tube).

Arterial Blood

Arterial blood specimens are usually taken only for blood gas analyses, in which case it is important that the syringe is properly heparinised and that the blood is collected anaerobically. When the heparinised syringe has been filled with blood remove any air bubbles and seal with a plastic syringe cap. Mix the blood by inversion and label the syringe before taking it to the analyser. Keep the syringe in ice if the analysis cannot be performed immediately.

Capillary Blood

Capillary blood should be collected whenever possible in children to avoid the occasional hazards of venepuncture. However, good collecting technique is essential in the interests of both the quality and the quantity of the specimen.

Cerebrospinal Fluid

Cerebrospinal fluid (CSF) for protein estimation should be collected after the microbiology samples to minimise inadvertent contamination with blood. CSF samples for measurement of glucose should be collected into fluoride oxalate and accompanied by a blood sample collected into a similar tube.

Urine

Random urine samples

An aliquot of random (usually early morning) urine is best collected into plastic WHITE CAPPED universal (Sterilin) bottles. NEVER use red capped Sterilin bottles for chemical pathology.

Random urines for **osmolality** should be accompanied by a sample for serum osmolality.

Timed urine samples

Urine collection bottles may contain a preservative that has safety hazards. It is important that the patient is instructed **NOT TO VOID URINE DIRECTLY INTO THE CONTAINER**.

It is essential that timed urine collections are made with great care. Precise instructions must be given regarding the emptying of a patient's bladder at the start of the collection period (discarding the urine).

It is usually convenient to collect a 24 hour urine from one morning to the next. At some suitable time, e.g. 08.00 hrs, the bladder is emptied and the urine discarded. All urine passed during the day and the following night is collected. The bladder is emptied at the same time the following morning and this sample is added to the collection. The bladder should be emptied and the urine saved before defecation.

Refrigerate the urine during the collection if possible and send it to the laboratory with the minimum of delay when the collection is complete. Appropriate preservatives may be necessary and since these will be added to each bottle when it is requested from the department, the bottles should not be emptied or rinsed before use and they should not be used for assays for which they were not requested.

Faeces

A small sample of a random specimen is best put in a plastic, white capped, universal (Sterilin) bottle. For occult blood detection, it is advisable to send specimens collected on three consecutive days and note dietary restrictions.

Calculi

May be sent in any clean container.

Miscellaneous body fluids

Pleural, ascitic and fluids of unknown origin should be collected into WHITE CAPPED (Sterilin) bottles.

Reporting results

Completed printed reports will be returned to the wards and units as soon as possible but interim reports may be issued when any delay is expected because a more difficult or time-consuming analysis has been requested. Results on routine in-patient and out-patient samples are usually available on Ward Enquiry as soon as they are authorised.

Unexpected or grossly abnormal results will, whenever possible, be telephoned to the requesting doctor.

Results of emergency analyses may also be telephoned, but results reported in this way are a frequent source of error, so please repeat the results back to the laboratory staff when they have been recorded. Please do not telephone the laboratory for results unless you cannot find them in any other way. Constant interruptions delay the flow of work.

Phoning Policy

Results will be telephoned under the following circumstances:

If Pathology Ward Enquiry is working:

i) If we have been contacted by the Doctor who requests results to be phoned.

ii) When the request is from a GP or Outpatients and marked "please phone".

iii) Results for salicylate, paracetamol, carboxy Hb.

iv) For SCBU and ITU: we will inform the units that the results are now available on Ward Enquiry. Results will not normally be phoned unless we have been requested to do so by the doctor, or they are outside the Action Limits, over the page.

v) For all other wards and GPs/OPD's results will be phoned if they are outside the Action Limits over the page.

If Apex Ward Enquiry is not working:

Same as above, but we will endeavour to telephone all A&E, ITU, MAU and SCBU results.

Telephoning Abnormal Results

Table 7 shows the action limits for telephoning abnormal (no previous history) chemical pathology results.

Table 7

Test	Result	Result	Units
Sodium	<126	>150	mmol/L
Potassium	<2.8	>6.1	mmol/L
Urea	N/A	>15.0	mmol/L
Creatinine	N/A	>250	µmol/L
Non diabetic glucose	<2.8	>15	mmol/L
Diabetic glucose	<2.8	>20	mmol/L
Adjusted calcium	<1.8	>2.85	mmol/L
Chloride	<80	>110	mmol/L
Amylase	N/A	>300	UI/L
Digoxin	N/A	>2.7	µg/L
CK	N/A	>400	U/L
Paediatric Bilirubin	N/A	>300	mmol/L
Lithium	N/A	>1.20	mmol/l
Phosphate	<0.3		mmol/L
AST	15 X upper limit of normal (ULN)		U/L
ALT	15 X ULN		U/L
Carbamazepine	>25		mg/L
Theophylline	>25		mg/L
Phenytoin	>25		mg/L
Phenobarbitone	>70		mg/L
Triglyceride	Greater than 20		mmol/l
CRP	Greater than 300		mg/L
Troponin I	**GP** Greater than 0.04		

Results that are critical, as defined above, with no previous history, will be telephoned to the requesting ward/clinician/GP as soon as possible and a comment of the action will be entered into APEX. When the results have been phoned and the appropriate comment entered into LIMS, the results are then authorised as complete.

Near patient testing

The Trust Point of Care Committee oversees the practice of all professional staff involved in the use of point of care devices (near patient testing). The Point of care team, with support from Blood Sciences, are responsible for staff training, maintenance and quality control of the Blood Gas/Electrolyte analysers, which are situated in the following areas:

- A&E
- MAU
- CCU
- Theatres
- NICU
- CDS

- Oxborough

These analysers may only be used by staffs that have a record of training and instruction via a point of care team delegated trained member of staff from blood sciences. Arrangements for this training should be made to the point of care co-ordinator by telephone (ext. 3599 9am-5pm only) or email (david.pemberton@qehkl.nhs.uk – point of care co-ordinator).

It should be remembered that safety regulations apply equally to biochemical investigations carried out away from the main laboratory and side room analyses. Whether automated or simple "stix tests" are used, this must not be undertaken in rooms used for eating, drinking or smoking. Any spillage's must be promptly wiped up and the area disinfected with Precept 1000 ppm for routine disinfection of surfaces (10,000 ppm if visible contamination). In the event of any difficulty with the performance or interpretation of such tests please contact point of care team on ext. 3599 or the main laboratory on ext. 3771.

Paediatric investigations

Test priority

Because of the small sample volume available for measurement of blood constituents, test priority should be indicated in case there is insufficient sample to perform everything requested.

Sweat tests

Sweat tests are carried out by a biomedical scientist trained and experienced in this technique. Arrangements for sweat tests can be made by telephone (extension 3797 – Maggie Pate, Blood Sciences Secretary).

Suspected inborn errors of metabolism

In addition to general biochemistry, the majority of these requests will require some or all of the following investigations:

- plasma amino acids — 1 ml blood in paediatric lithium heparin tube (green top)
- urine amino acids, urine organic acids, urine glycosoaminogylcans — 5-10 ml urine in a plain (white top) universal
- blood ammonia — 2 ml blood in paediatric lithium heparin tube (green top), collected on ice (Lab must have prior notice. Sample must reach Lab within 20 mins of collection).
- blood lactate — 1 ml blood in fluoride oxalate tube (Lab must have prior notice. Take sample without stasis and ensure sample arrives in lab within 1 hour of collection).
- acyl carnitine profile — 3-4 spots of blood on a Guthrie card

Where possible samples should be collected during acute illness.
Relevant clinical details must be provided, including drug and diet history.

Please contact senior biochemistry staff for advice and when urgent analyses are required.

Thyroid Function testing

For routine thyroid function testing, TSH will be measured as first line testing. Secondary testing, including FT4 and or FT3, will be initiated by the laboratory depending upon the clinical details supplied and the result of the initial TSH result.

If the TSH level is less than 0.50 mU/l or greater than 4.0 mU/l a free T4 level will be measured on the same sample. An FT3 request will be added if the TSH is low and the FT4 result is high normal or abnormally high and the patient is either suspected of having hyperthyroidism or on carbimazole treatment.

Please state suspected diagnosis and give details of any recent thyroid related therapy – otherwise the test cascade will not operate properly.

Please do not request thyroid function tests on acutely ill patients unless there is reason to believe that thyroid disease is responsible for their acute condition. The results are difficult to interpret in the acutely ill.

Patients on total parenteral nutrition

Blood samples from patients on total parenteral nutrition must be sent to the laboratory as early in the day as possible and preferably by 09:30. Please write 'TPN' on the request form. The results will then be telephoned and/or made available on the Ward Enquiry system as soon as possible so that the patient's fluid and electrolyte intake can be adjusted accordingly.

Troponin testing

Assay of serum Troponin I is available for the investigation of patients with suspected acute coronary syndromes (ACS). The samples should be taken on admission and repeated 12 hours post admission if the initial Troponin I result is not elevated. Levels of Troponin I frequently remain elevated for up to 7 days post AMI/ACS.

Protein electrophoresis

Serum protein electrophoresis is carried out:

- When specifically requested.
- When total protein and albumin results indicate a very high globulin value.

Immunoglobulins (IgG, IgA and IgM) are measured:

- When specifically requested with appropriate clinical details.
- In order to investigate an abnormality detected by serum protein electrophoresis.

When **myeloma** is suspected please send a fresh random (preferably early morning) 20 mL urine sample for Bence Jones protein, in a white capped universal container, along with the serum sample for electrophoresis. Without the urine sample, myeloma cannot be excluded.

It is important to discuss investigation of **cryoglobulinaemia** with the laboratory in advance as the samples have to be handled in a special way.

Investigation of suspected phaeochromocytoma and carcinoid

For suspected **phaeochromocytoma** the initial screen is measurement of 24 hour urinary free catecholamines (adrenaline, noradrenaline and dopamine). In addition to physiological stress, a number of drugs may interfere with the results including: labetalol, atenolol, captopril, enalapril, lisinopril, tricyclic antidepressants, phenothiazines, MAOIs, dopaminergic drugs, eg levodopa. It is preferable to instruct patients to stop beta blocking or dopaminergic drugs for 2 days prior to collection. However this may be contraindicated in some patients where a rebound hypertensive episode can be precipitated. There are no dietary restrictions other than to refrain from excessive coffee intake.

Sample: 24 hour urine Collection.

Note that the container supplied contains an acid preservative. The appropriate collection instructions are issued with each container. The patient is instructed not to void urine directly into the container. ***It is important to reinforce this precaution***.

A single 24 hr urine collection is usually sufficient. However, in the presence of highly suggestive symptoms, such as paroxysmal hypertensive episodes, multiple 24 hr urine collections might be required. Please contact the lab for further advice.

For suspected **carcinoid** tumours there are no drug or dietary restrictions.

Sample: 24 hour urine Collection.

Note that the container supplied contains an acid preservative. The appropriate collection instructions are issued with each container. The patient is instructed not to void urine directly into the container. ***It is important to reinforce this precaution***.

Faecal occult blood testing

The following dietary/drug restrictions are advised 3 days prior and during the tests:

- Avoidance of: - Red meat, e.g. beef, lamb, pork, liver, sausages etc. (eat poultry or white fish, e.g. cod, instead).

- Avoidance of the following vegetables and fruit:- Cauliflower, Turnip, Parsnip, Horseradish, French Beans, Melon, Artichoke, Bananas, Broccoli, Radish, Cucumber, Mushrooms, Courgette, Beetroot, Tomatoes (uncooked).

- Avoidance of: - Vitamin C tablets, Aspirin and aspirin-like drugs, i.e. Brufen, Indocid, Naproxen etc., Alcohol, Iron tablets.

Therapeutic drug monitoring

Anticonvulsants

Routinely measured, include:

- Phenytoin
- Carbamazepine

- Phenobarbitone

Other anticonvulsants, including valproate, ethosuximide, are not routinely available. If there is a persuasive clinical reason for testing, please contact the lab in the first instance for discussion.

Please supply adequate information of:

Therapy: Drugs, dose, frequency, date and time of last dose. Time when sample taken.

Clinical: Type of fit, frequency, toxic side effects, etc.

Sampling Time: Immediately before next dose. Following a change in therapy it is advisable to allow time for re-equilibration of the new dose (2-3 weeks).

Digoxin

Collect specimens at least 6 hours after last dose.

Lithium

Collect specimen 12 hours after last dose.

Theophylline

Collect specimen immediately before next dose (trough) or, if given IV, 6-8 hours post dose.

Investigation of drug abuse

The most useful specimen for detection of drugs of abuse is urine. If possible, a minimum of 20 ml fresh urine, collected under supervision, should be sent to the laboratory. The urine must be collected in a white top universal container. Red top universal containers (boric acid preservative) are unsuitable for Chemical Pathology investigations. Where possible, information on the drugs the patient may have taken should be provided on the request form.

In certain circumstances, for medico legal purposes, gastric washings (if available) and 10 ml heparinised blood can be sent to the laboratory where they can be stored for two weeks and made available for collection by a legally authorised party later if appropriate.

Paracetamol poisoning

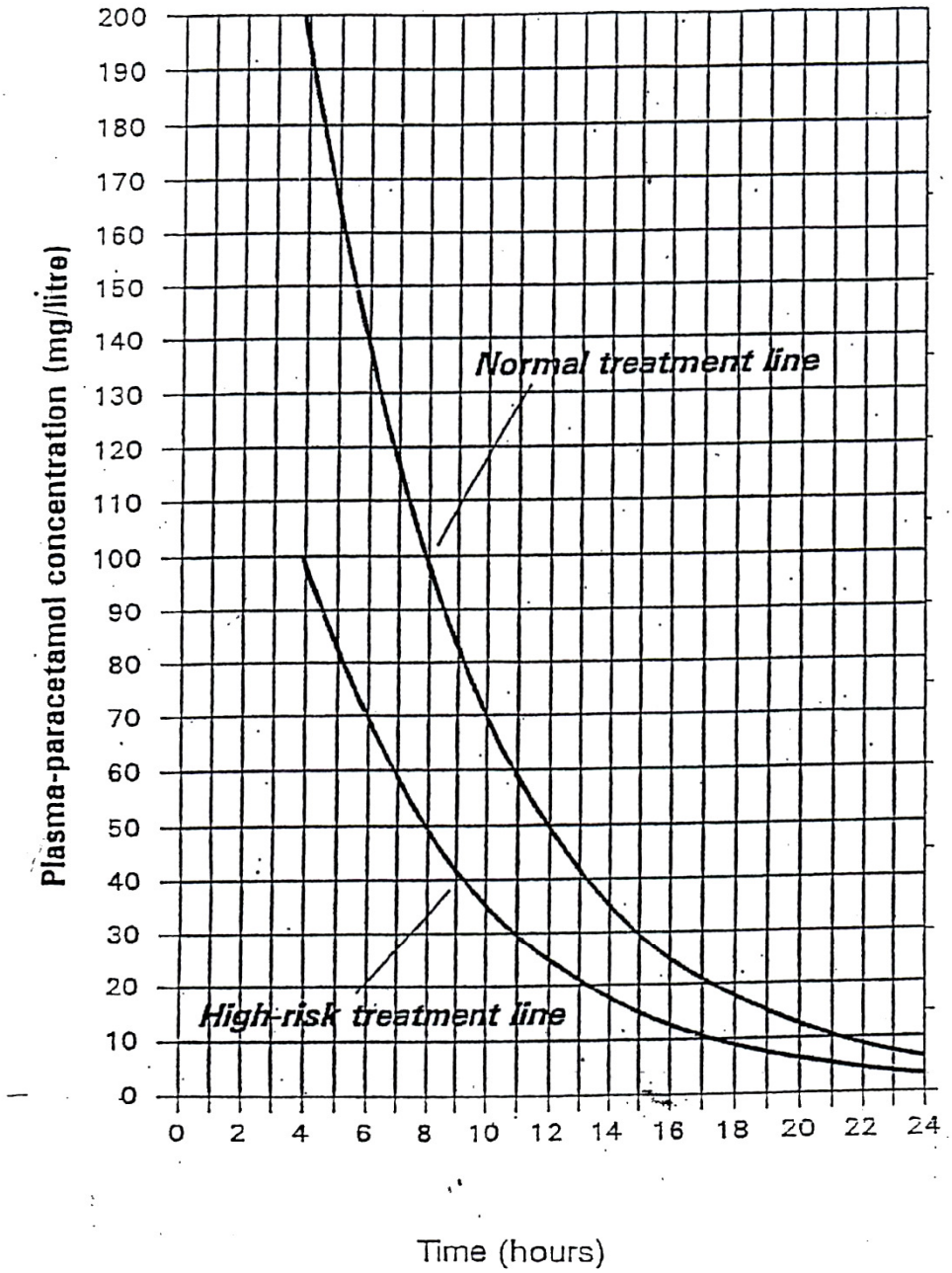
The National Poisons Information Service recommend treatment following ingestion of more than 5g paracetamol by an adult (12 years or over) or 150 mg/kg body weight by a child.

The risk of developing liver damage is best assessed by measuring a serum paracetamol concentration. Blood should be taken at **not less than** four hours post-ingestion. Samples do not have to be taken before Parvolex is given. If the level falls above the relevant treatment line shown in figure 2 then the patient is at risk of liver damage.

The prothrombin time and serum transaminase measurements are helpful in monitoring the development of liver damage.

NB:- malnourished people or those with induced liver enzymes, e.g. alcoholics or epileptics on anticonvulsant drug therapy, may be more susceptible to lower doses of paracetamol and should be treated with lower paracetamol levels. This also applies if the overdose has been taken chronically.

Figure 2



Patients whose plasma-paracetamol concentrations are above the normal treatment line should be treated with acetylcysteine by intravenous infusion (or, provided the overdose has been taken within 10–12 hours, with methionine by mouth). Patients on enzyme-inducing drugs (e.g. carbamazepine, phenobarbitone, phenytoin, rifampicin, and alcohol) or who are malnourished (e.g. in anorexia, in alcoholism, or those who are HIV-positive) should be treated if their plasma-paracetamol concentrations are above the high-risk treatment line.

Lipid analysis

When lipids are requested on fasting samples, the laboratory will routinely measure total cholesterol, HDL, cholesterol. Triglycerides will be measured when specifically requested. Please note that meaningful triglycerides measurements can only be undertaken on fasting samples. Lipid results are significantly affected by major acute illness and following myocardial infarction it may take up to 8 weeks for lipid values to return to pre-infarct baseline values.

Prior to initiation of long term lipid lowering therapy, secondary causes of hyperlipidaemia such as hypothyroidism, diabetes, alcohol abuse, obstructive liver disease and nephrotic syndrome should be excluded.

All patients on lipid lowering drug therapy should have regular monitoring of their liver function and CK.

Guidance on the requesting of tumour markers

Tumour markers are relatively expensive tests; please request them selectively. The following guidance has been formulated to assist with the selection of the most appropriate assays for a given clinical situation.

General Guidance

1. No serum marker in current use is specific for malignancy.

2. Many patients with early localised disease will have normal levels of serum tumour markers

3. No cancer marker has absolute organ specificity. PSA however, appears to be relatively specific for prostate tissue.

4. Requesting of multiple markers (such as CEA and the CA series of antigens) in an attempt to identify an unknown primary cancer is rarely of use.

5. Reference ranges for cancer markers are not well defined and are used only for guidance. Please note that a level within the reference range does not exclude malignancy while concentrations above the reference range do not necessarily mean the presence of cancer. Changes in levels over time are often more clinically useful than absolute levels at one point in time.

PSA

PSA is an extremely useful marker for the detection of prostatic cancer and for monitoring treatment of patients with known carcinoma of the prostate.

It is important to recognise that in addition to prostate cancer and benign prostatic hypertrophy a number of factors can give rise to significant increases in PSA including UTI, prostatitis, recent ejaculation (within 24 hrs), retention, prostate biopsy, catheterisation and cystoscopy. A repeat PSA should be considered if any of these factors are present.

CEA (Carcinoembryonic antigen)

Although primarily considered to be a tumour marker for colorectal cancer, less than 50% of patients with Dukes A or Dukes B colorectal cancer will have an elevated serum CEA level at presentation. Furthermore, CEA may be elevated in almost any advanced adenocarcinoma. It is also elevated in a variety of non-malignant conditions including hepatitis, cirrhosis, obstructive jaundice due to gallstones, ulcerative colitis, Crohn's disease, renal disease and smokers.

The main clinical indication for the measurement of CEA is for monitoring patients with known colorectal cancer, when it may provide a lead time for the detection of recurrence. It may also be helpful for monitoring the response to chemotherapy or radiotherapy in patients with advanced disease.

Ca 12-5

Ca 12-5 is a glycoprotein antigen associated with epithelial ovarian cancer. It is elevated in approximately 80% of all cases of epithelial ovarian cancer, but only 50% of early (stage 1) disease.

Ca 12-5 is not specific for ovarian cancer and a variety of non-ovarian intra-abdominal cancers may give rise to elevated serum levels, including colorectal, gastric, cervical, endometrial and pancreatic cancers. Ca 12-5 may also be elevated in patients with advanced lung and breast cancer. Ca 12-5 is also elevated in a range of non-malignant conditions, including endometriosis, pelvic inflammatory disease, cirrhosis and peritonitis. Furthermore, menstruation and pregnancy may be associated with moderately raised levels up to 3 times the upper reference limit.

The main established clinical applications for the measurement of Ca 12-5 are for monitoring treatment of patients with known ovarian cancer and as an aid in the differentiation of malignant and benign pelvic masses.

Ca 153

Ca 153 is a transmembrane glycoprotein antigen most commonly associated with breast and other adenocarcinomas. Unfortunately, Ca 153 is rarely elevated in patients with early disease and may be elevated in non-malignant conditions including cirrhosis.

The main clinical application for the measurement of Ca 153 is for monitoring patients with known breast cancer.

Ca 19/9

Ca 19/9 is a mucin antigen most commonly associated with pancreatic adenocarcinoma. Ca 19/9 may also be elevated in patients with gastric and cholangiocarcinomas. For colorectal cancer, CEA is generally more valuable than Ca 19/9.

Unfortunately, Ca 19/9 is also frequently elevated in a variety of non malignant conditions, particularly obstructive jaundice due to gall stones (where very high levels may be seen), acute and chronic pancreatitis, cholangitis and cirrhosis.

The main clinical indication for the measurement of Ca 19/9 is as a diagnostic aid for pancreatic adenocarcinoma and for monitoring patients who are known to have the disease.

Alpha-Fetoprotein (AFP)

AFP is a glycoprotein, which performs some of the functions of albumin in the foetal circulation.

AFP is usually elevated in the serum of patients with non-seminomatous germ cell tumours of the testis, ovary and other sites, hepatocellular carcinoma and hepatoblastoma. Measurement of AFP may be useful for diagnosis and monitoring treatment of patients with these tumour types.

Non-malignant conditions which may give rise to elevated serum levels include hepatitis, cirrhosis, biliary tract obstruction, alcoholic liver disease, ataxia-telangiectasia and hereditary tyrosinaemia.

Serum AFP is also increased in pregnancy and the first year of life. Infants have extremely high levels, which fall to adult values between 6 months and 1 year of age.

Simple dynamic function tests

NB: Protocols for a more extensive range of dynamic function tests are available from the Biochemistry Laboratory if required.

BNP Request Form

Consultant Chemical Pathologist
Blood Sciences Department

Hospital No:..... *Date of Birth:* .....

Surname: ..... *Forename(s):* .....

Male ☐ *Female* ☐

Address: .....

.....

Affix adrema label above if available

Name of GP: ..... *Surgery:* .....

Sample required: 3mL EDTA

Date of Sample: ..... *Time of collection* .....

Symptoms

Breathlessness	☐ On exertion	☐ At rest	☐ None
Oedema	☐ Yes	☐ No	
Fatigue	☐ Yes	☐ No	

Investigations

Chest X-ray	☐ Normal	☐ Abnormal	☐ None done yet
ECG	☐ Normal	☐ Abnormal	☐ None done yet

Department of Chemical Pathology Specimen requirements

Adult Reference and therapeutic drug ranges

Tests not appearing on this list may be available. Advice should be sought from the laboratory.

Chemical Pathology

Assay	Code	Comment	Reference Range	Units
Acetaminophen	ACTM		10 to 30	mg/L
Adjusted Calcium	CCA		2.20 to 2.60	mmol/L
Adrenaline	UADR	Urine	0 – 250	nmol/24hrs
Alanine Transaminase	ALT		10 to 49	U/L
Albumin	ALB		32 to 48	g/L
Albumin/Creatinine Ratio	ACR		0 to 2.5	mg/mmol
Alkaline Phosphatase	ALP		20 to 140	U/L
Alpha-1-Antitrypsin	A1AT		0.90 to 2.00	g/L
Alpha-Fetoprotein	AFP		0 – 7.0	KU/L
Ammonia	AM		11.2 to 35.4	µmol/L
Amylase	AMY		30 to 118	U/L
Angiotensin Converting Enzyme	ACE		20 to 112	U/L
Aspartate Aminotransferase	AST		0 to 34	U/L
Beta-2-Microglobulin	B2M		1 – 1.8	mg/L
Bicarbonate	BIC		20 to 31	mmol/L
Bile Acid	BIAC		0 to 14	µmol/L
B-Type Natriuretic Peptide	BNP		2 to100	pg/ml
CA125	CA125		0 – 37	KU/L
CA19/9	CA19/9		0 – 37	KU/L
Calcium	CAL	Serum	2.20 to 2.60	mmol/L
	24UCAL	24 hour urine	2.5 to 7.5	mmol/24hr
	UCA	Random urine	No range	mmol/L
Carbamazepine	CARB		4 to 12	mg/L
Carboxyhaemoglobin	COHB		0 – 4.0	%
Carcinoembryonic Antigen	CEA		0 – 10	µg/L
Chloride	CL	Serum	99 to 109	mmol/L
Cholesterol	CHOL		3.6 to 6.7	mmol/L
Cholinesterase	PCHOL		4.9 to 11.9	KU/L
Complement C3	C3		75 to 165	mg/dL
Complement C4	C4		20 to 65	mg/dL
Cortisol	CORT		No range	nmol/L
C-Reactive Protein (CRP)	CRP		4 to 10	mg/L
Creatinine	CRE	Serum	55 to 120	µmol/L
	24UCRE	24 hour urine	9 to 16	mmol/24hr
	UCRE	Random urine	No range	mmol/L
Creatinine Kinase	CK	Male	32 to 294	U/L
		Female	33 to 211	U/L
Digoxin	DIG		0.78 to 2.0	µg/L
Direct Bilirubin	DBIL		0 to 3.4	µmol/L
Dopamine	UDOPA	Urine	0 – 3300	nmol/24hrs
Indirect Bilirubin	IBIL		No range	µmol/L
Estimated Glomerular	EGFR		>90	mL/mn/1.7

Assay	Code	Comment	Reference Range	Units
Filtration Rate (eGFR)				
Ethanol	ETOH		No range	mg/dL
Ferritin	FER	Male	22 to 322	ng/ml
		Female	10 to 291	ng/ml
Folate	SF	Deficient	<3.4	ng/ml
		Indeterminate	3.4 to 5.4	ng/ml
		Normal	>5.4	ng/ml
Follicle-Stimulating Hormone	FSH	Follicular	2.5 to10.2	IU/L
		Luteal	1.5 to 9.1	
		Post Menopausal	23.0 to 116	
		Male	1.4 to 18.1	
Free T3	FT3		3.5 to 6.5	pmol/L
Free T4	FT4		11.5 to 22.7	pmol/L
Gamma-Glutamyl Transferase	GGT	Male	0 to 73	U/L
		Female	0 to 38	
Globulin	GLOB		12 to 40	g/L
Glucose	GLUC	Serum	3.2 to 6.0	mmol/L
	CGLUC	CSF	No range	mmol/L
	GLUC	Blood gas	3.2 to 6.0	mmol/L
Growth Hormone	GH		No Range	µg/L
Haemoglobin A1C	HBDCCT		3.8 to 5.4	%
	HBIFCC		No Range	mmol/mol
Haptoglobin	HAPT		0.30 to 2.00	g/L
High Density Lipoprotein	HDL		No range	mmol/L
Human Chorionic Gonadotropin	HCG		2 to 10	IU/L
Immunoglobulin A	IGA	0 – 14 Days	0.01 to 0.08	g/L
		14 Days – 6 Weeks	0.02 to 0.15	
		6 Weeks – 2 Months	0.05 to 0.40	
		2 Months – 6 Months	0.20 to 0.70	
		6 Months – 9 Months	0.15 to 1.00	
		9 Months – 1 Year	0.30 to 1.20	
		1 Year – 2 Years	0.30 to 1.30	
		2 Years – 3 Years	0.50 to 2.40	
		3 Years – 6 Years	0.70 to 2.50	
		6 Years – 9 Years	0.80 to 2.80	
		9 Years – 15 Years	0.90 to 3.40	
		15 Years – 150 Years	0.80 to 4.0	
Immunoglobulin G	IGG	0 – 14 Days	5.0 to17.0	g/L
		14 Days – 6 Weeks	3.9 to13.0	
		6 Weeks – 2 Months	2.1 to 7.7	
		2 Months – 6 Months	2.4 to 8.8	
		6 Months – 9 Months	3.0 to 9.0	
		9 Months – 1 Year	3.0 to 10.9	
		1 Year – 2 Years	3.1 to 13.8	
		2 Years – 3 Years	3.7 to 15.8	
		3 Years – 6 Years	4.9 to 16.1	
		6 Years – 9 Years	5.4 to 16.1	
		9 Years – 45 Years	5.4 to 16.1	
		45 Years – 150 Years	5.3 to 16.5	
Immunoglobulin M	IGM	0 – 14 Days	0.05 to 0.20	g/L
		14 Days – 6 Weeks	0.08 to 0.40	
		6 Weeks – 2 Months	0.15 to 0.70	

Assay	Code	Comment	Reference Range	Units
		2 Months – 6 Months	0.20 to 1.00	
		6 Months – 9 Months	0.40 to 1.60	
		9 Months – 1 Year	0.60 to 2.10	
		1 Year – 9 Years	0.50 to 2.20	
		9 Years – 99 Years	0.50 to 1.90	
		99 Years – 150 Years	0.50 to 2.00	
Iron	IRON	Male	11.6 to 31.3	µmol/L
		Female	9 to 30.4	µmol/L
Iron Saturation	SAT		No Range	%
Lactate	LACT		0.50 to 2.20	mmol/L
Lactate Dehydrogenase	LDH		120 to 246	U/L
Lithium	LI		0.6 to 0.8	mmol/L
Low Density Lipoprotein	LDL		No Range	mmol/L
Luteinizing Hormone	LH	Follicular	1.9 to12.5	IU/L
		Luteal	0.5 to16.9	
		Post Menopausal	15.9 to 54	
		Male	1.5 to 9.3	
Magnesium	MAG	Serum	0.53 to 1.11	mmol/L
	24UMAG	24 hour urine	3.00 to 5.00	mmol/24hr
	UMAG	Random urine	No range	mmol/L
Metadrenaline	UMET	Urine	0 - 200	nmol/24hrs
Microalbumin	UALB	Random urine	No range	mg/L
Noradrenaline	UNOR	Urine	0 – 700	nmol/24hrs
Normetadrenaline	UNMET	Urine	0 – 390	nmol/24hrs
Oestradiol	E2	Male	<146	pmol/L
		Female	Post Menopausal: <118	pmol/L
			Reproductive: 72 - 1309	
Osmolality	OSMO	Serum	280 to 300	mOsmol/kg
	UOSMO	Urine	300 to 1100	mOsmol/kg
Parathyroid Hormone	PTH		1.50 to 7.60	pmol/L
pCO2	PCO2	Blood gas	4.7 to 6.0	KPa
pH	PH	Blood gas	7.35 to 7.45	
Phosphate	PO4	Serum	0.78 to 1.65	mmol/L
	UPHOS	Urine	No range	mmol/L
	24UPHO	24 hour urine	12.9 to 42.0	mmol/24hr
pO2	PO2	Blood gas	10 to 14	KPa
Phenobarbitone	PHENO		15 to 40	mg/L
Phenytoin	PHENY		10 to 20	mg/L
Potassium	K	Serum	3.5 to 5	mmol/L
	24UK	24 hour urine	25 to 125	mmol/24hr
	UK	Random urine	No Range	mmol/L
	K	Blood gas	3.5 to 5.0	mmol/L
Procalcitonin	PCT		0 – 0.5	ng/ml
Progesterone	PROG	Follicular	0.48 to 4.45	nmol/L
		Luteal	16.4 to 59	nmol/L
		Post	ND - 2.32	nmol/L
		Male	0.89 - 3.88	nmol/L
Prolactin	PROL		56 to 566	mIU/L
Prostate Specific Antigen	PSA		0.1 to 4.0	ng/ml
Red Cell Folate	RCF		280 to 791	ng/ml

Assay	Code	Comment	Reference Range	Units
Rheumatoid Factor	RHF		9.3 to 14	IU/ml
Salicylate	SALS	Toxic	10 to 300	mg/L
Sodium	NA	Serum	135 to 145	mmol/L
	24UNA	24 hour urine	40 to 220	mmol/24hr
	UNA	Random urine	No range	mmol/L
	NA	Blood gas	135 to 145	mmol/L
Sweat NaCl Equivalent	SWEAT		0 to 80	mmol/L
TCO2	TCO2	Blood gas	23 to 33	mmol/L
Testosterone	TEST	Male	6.6 to 25.3	nmol/L
		Female	0.5 to 3.0	nmol/L
Theophylline	THEO		10 to 20	mg/L
Thyroid Peroxidase Antibody	TPO		0 – 35	U/ml
Thyroid Stimulating Hormone	TSH		0.35 to 5.50	mIU/L
Total Bilirubin	TBIL		0 to 20	µmol/L
Total Cholesterol/HDL Ratio	T/CHRT		No range	
Total Iron-Binding Capacity	TIBC		45 to 81	µmol/L
Total Protein	TP		57 to 82	g/L
	24UTP	24 hour urine	0.01 to 0.14	g/24hr
	UTP	Random urine		g/L
	CTP	CSF	0.15 to 0.40	g/L
Triglyceride	TG		0.8 to 1.9	mmol/L
Troponin I	TROPI		0.01 to 0.04	ng/ml
Urea	UREA	Serum	2.5 to 6.5	mmol/L
	24UURE	24 hour urine		mmol/24hr
	UUREA	Random urine		mmol/L
Uric Acid	UA	Male	0.22 to 0.55	mmol/L
		Female	0.18 to 0.46	mmol/L
	24URIC	24 hour urine		mmol/24hr
	UUA	Random urine	No range	mmol/L
Valproate	VALP		50 to 100	mg/L
Vitamin B12	B12	Normal	>246	pg/ml
		Deficient	<211	pg/ml
		Indeterminate	211-246	pg/ml

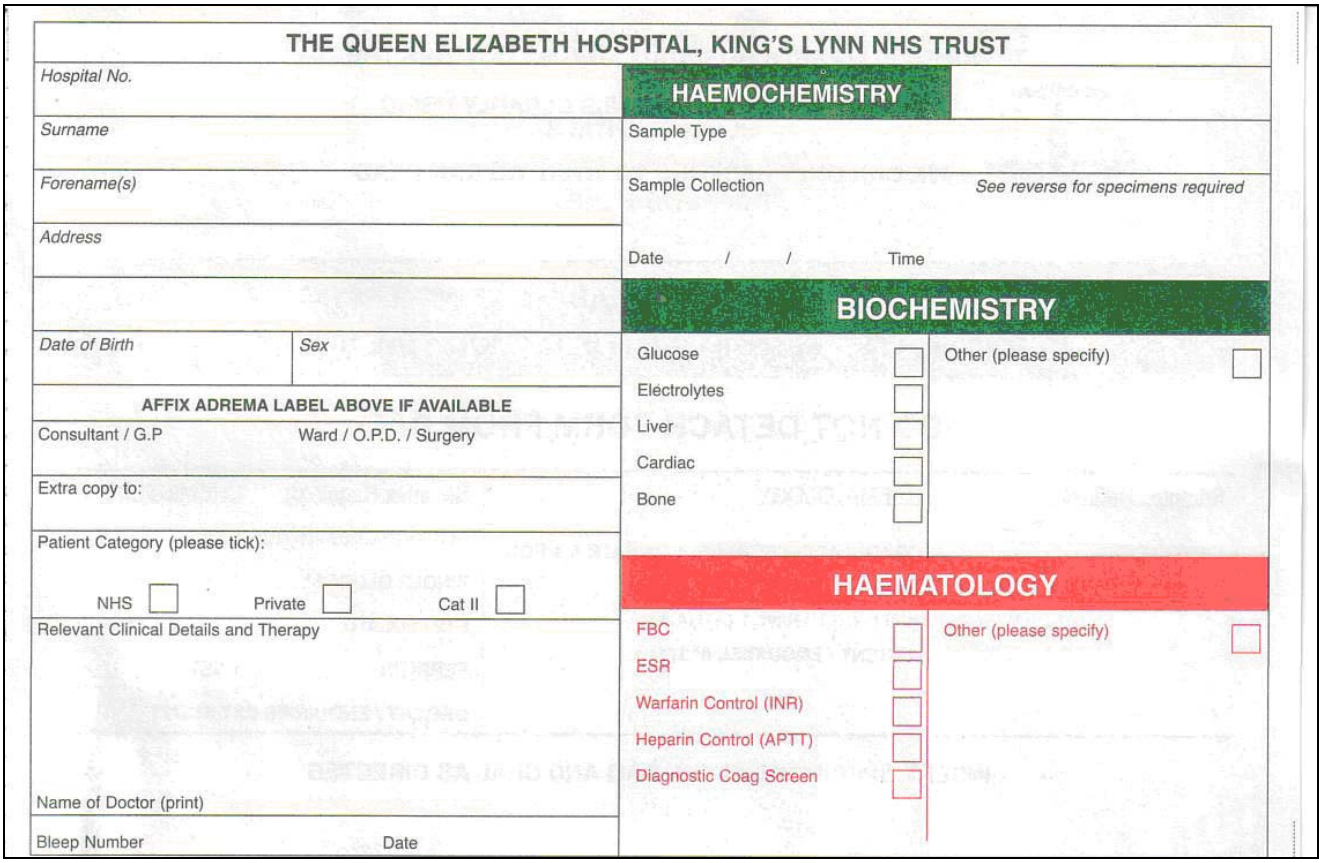
Unknown genders will default to male reference ranges for Chemical Pathology analytes.

Haematology & Blood Transfusion

Request Form

The haematology request form is combined with the chemical pathology discipline as shown by figure 4.

Figure 4



THE QUEEN ELIZABETH HOSPITAL, KING'S LYNN NHS TRUST

Hospital No.

Surname

Forename(s)

Address

Date of Birth | Sex

AFFIX ADREMA LABEL ABOVE IF AVAILABLE

Consultant / G.P | Ward / O.P.D. / Surgery

Extra copy to:

Patient Category (please tick):

NHS ☐ Private ☐ Cat II ☐

Relevant Clinical Details and Therapy

Name of Doctor (print)

Bleep Number | Date

HAEMOCHEMISTRY

Sample Type

Sample Collection — See reverse for specimens required

Date / / Time

BIOCHEMISTRY

Glucose ☐
Electrolytes ☐
Liver ☐
Cardiac ☐
Bone ☐

Other (please specify) ☐

HAEMATOLOGY

FBC ☐
ESR ☐
Warfarin Control (INR) ☐
Heparin Control (APTT) ☐
Diagnostic Coag Screen ☐

Other (please specify) ☐

Care should be taken to fill in the form correctly. All details are essential and should be written in block capitals if patient demographic stickers are not available. Please enter sample type and date/time of collection, as well as pertinent clinical information. Please also state the requester and location you would like the results returned to.

Vacant	Consultant Haematologist	3609	
Dr. AJ Keidan/ Dr P Coates	Consultant Haematologist		
Dr. M Lewis	Consultant Haematologist	3401	
Dr. L Cooke	Consultant Haematologist	3030	
Dr. E Gudgin	Consultant Haematologist	3621	

Mr Stephen Thompson Haematology Lead Biomedical Scientist 3561

Mr Adrian Ebbs Transfusion Manager 3782

Laboratory fax 01553 767742

E-MAIL: Pathology staff can be e-mailed at: forename.surname@qehkl.nhs.uk

General information

Laboratory Working Hours

Table 12 shows the haematology and blood transfusion department working hours.

Table 12

Mon	Tues	Wed	Thurs	Fri	Sat	Sun	Bank Hol
0800 - 1800					Out of hours procedure		

Enquiries

Working hours

Reception / results	3779
Urgent requests	3779

Out of hours

All transfusion requests **MUST** be bleeped to the duty Haematology BMS via Switchboard

On-call Consultant Haematologist contact via switchboard

Laboratory Services provided

Table 13 outlines the routine laboratory services provided within haematology and specimen requirements.

Table 13

Tests	Specimen Bottles
Full blood count + differential+/- film; reticulocytes	1x purple EDTA 3ml
Hb electrophoresis; malarial parasites; Glandular Fever screening test	1x purple EDTA 3ml
Solubility testing for HbS; G6PD screen	1x purple EDTA 3ml
ESR	1 x Viesse Vesmatic 30 1 ml tube
Coagulation: Please note that is essential that samples for Coagulation must be filled correctly and NOT haemolysed, otherwise they will be rejected. **For paediatric samples please discuss with laboratory on extension 3779.**	
Screening tests; anticoagulant control; FDP's; D Dimers	1x blue citrate (2.7ml)
Factor assays	2 x 2.7 ml
Thrombophilia screening	4 x citrate + 1 EDTA +1 gel

Special notes

- Sickledex solubility Test – not valid for infants < 6months, please request Hb electrophoresis
- The department offers Haemoglobinopathy screening. As from April 1st 2007, all women will be offered antenatal screening as a part of the National Antenatal and Newborn Screening programmes. The Haematology department is providing this service.
- Thrombophilia screening only performed after referral to Consultant Haematologist
- D Dimer testing will only be performed on samples from patients where a Well's score and clinical information have been supplied, it is not routinely offered to GP's.

Telephoning Abnormal Results

Table 14 displays the telephone alert limits of abnormal results.

Table 14

Results that are critical, as defined above, with no previous history, will be telephoned to the requesting ward/clinician/GP as soon as possible and a comment of the action will be entered

into APEX. When the results have been phoned and the appropriate comment entered into LIMS, the results are then authorised as complete.

Test	GP & Clinics	Inpatient
WBC	Neutrophils <1.0 <0.5 (chemo) > 20.0 (new)	New neutropenia's <1.0
Haemoglobin	<80 if no history	< 60 if new
Haematocrit	>0.55	>0.6
Platelets	<70 (if on anticoagulants) <20 (on chemo if falling) <10 (on chemo) <30 (new)	<20 (on chemo if falling) <10 (on chemo) <30 (new)
ESR	>100 (new)	-
Malarial parasites	Positive	Positive
Direct Coombs	Positive	Positive & anaemic
B12	If patient has pancytopenia	
INR – not on warfarin	>2.5	>2.5
INR – on warfarin	<1.5 or >4.5	>6.5
APTT ratio – not on heparin	>2.5	>2.5
APTT ratio – on heparin	N/A	>4.0

Response time

The response times for haematology requests are outlined in table 15.

Table 15

Request	Turn around time
Urgent routine requests	Within 1 hour
Routine results	Available on ward enquiry
FBC, ESR, GFST, coagulation	Same day
Hb electrophoresis	7 days (occasional samples are referred for confirmation, results then available 10 days from request)
G6PD	24 – 48 hr
Thrombophilia screen	2 weeks
HLA-B27	Within 2 weeks

Reports

Adult reference range and normal values for age and sex are available on Apex or via Pathology web site.

Haematology Reference Ranges

Table 16 shows the haematology reference ranges.

Table 16

Test	Age	Sex	Units	Normal Range
WBC	1 year	-	10^9/L	6.0 – 17.5
	5 years	-	"	5.0 – 14.5
	10 years	-	"	4.5 – 13.0
	Adult	-	"	4.4 – 10.0
Neutrophils	1 year	-	10^9/L	1.5 – 8.5
	5 years	-	"	1.5 – 8.0
	10 years	-	"	1.8 – 8.0
	Adult	-	"	1.8 – 7.7
Lymphocytes	1 year	-	10^9/L	4.0 – 10.5
	5 years	-	10^9/L	1.5 – 7.0
	10 years	-	10^9/L	1.5 – 6.5
	Adult	-	10^9/L	1.5 – 3.5
Monocytes	All ages	-	10^9/L	0.2 – 1.0
Eosinophils	Pre- adult	-	10^9/L	0.1 – 1.0
	Adult	-		0.02- 0.5
Basophils	All Ages	-	10^9/L	0.02 - 0.1
Haemoglobin	1 year	-	g/L	110 –130
	5 years	-	g/L	115 –155
	10 years	-	g/L	130 –160
	Adult	M	g/L	130 – 170
	Adult	F	g/L	125 – 165
RBC	1 year	-	10^{12}/L	3.7 – 5.2
	5 years	-	10^{12}/L	4.0 – 5.2
	10 years	-	10^{12}/L	4.0 – 5.2
	Adult	M	10^{12}/L	4.5 – 5.5
	Adult	F	10^{12}/L	3.8 – 4.8
Haematocrit	1 year	-	L/L	.30 – .38
	5 years	-	L/L	.34 – .40
	10 years	-	L/L	.35 – .45
	Adult	M	L/L	.41 – .50
	Adult	F	L/L	.36 – .46
MCHC	-	-	g/L	310 – 370
MCH	1 year	-	g/L	250 – 350
	5 years	-	g/L	240 – 300
	10 years	-	g/L	250 – 330
	Adult	-	g/L	270 – 320
MCV	1 year	-	fl	72 – 84
	5 years		fl	75 – 87
	10 years		fl	77 – 95

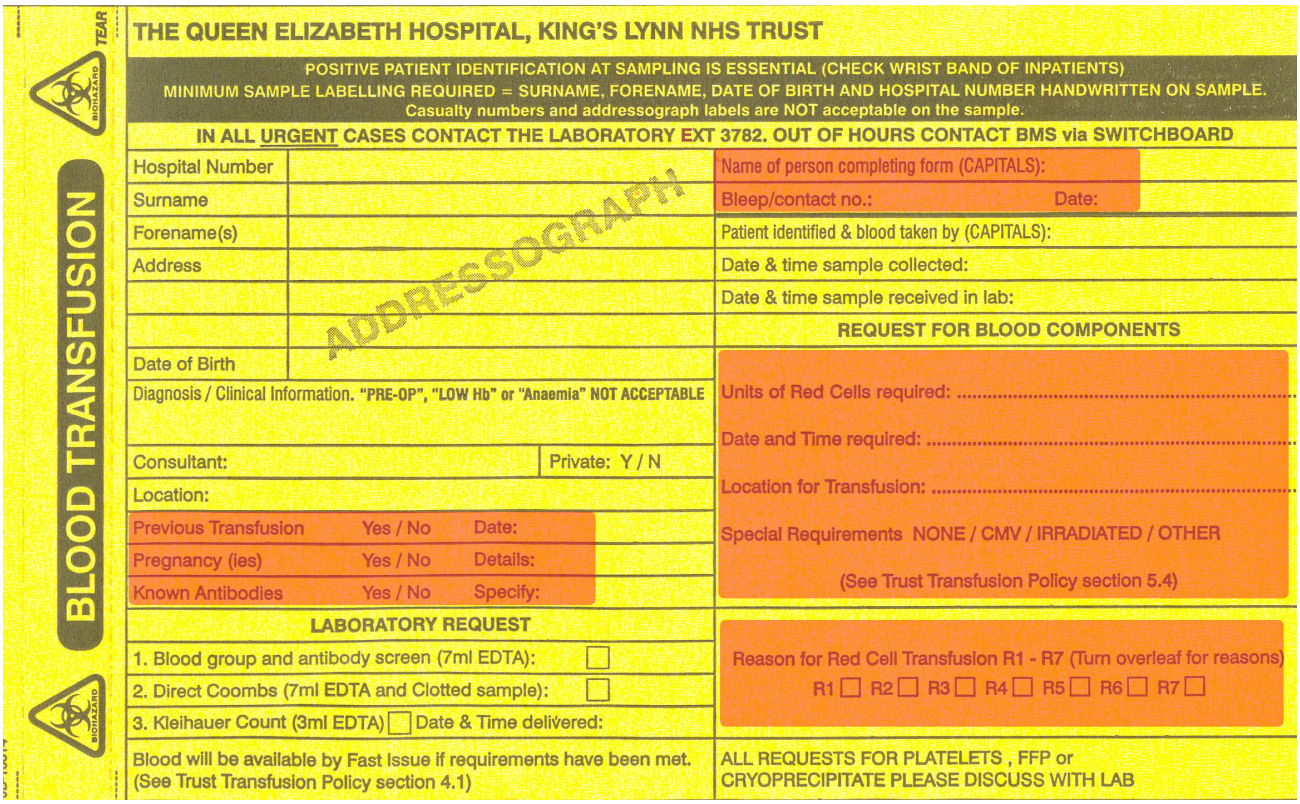
	Adult	M	fl	80 – 94
	Adult	F	fl	81 – 99
Reticulocytes	1 year	-	10^9/L	30 – 100
Reticulocytes	5 years		10^9/L	30 – 100
Reticulocytes	10 years	-	10^9/L	30 – 100
Reticulocytes	Adult		10^9/L	31 – 82
Platelets	1 year	-	10^9/L	200 – 550
	5 years	¤	10^9/L	200 – 490
	10 years		10^9/L	170 – 450
	Adult		10^9/L	150 – 410
ESR	M 17-50		mm in 1h	Upper limit 10
	M 51-60		mm in 1h	Upper limit 12
	M 61-70		mm in 1h	Upper limit 14
	M >70		mm in 1h	Upper limit about 30
ESR	F 17-50		mm in 1h	Upper limit 12
	F 51-60		mm in 1h	Upper limit 19
	F 61-70		mm in 1h	Upper limit 20
	F >70		mm in 1h	Upper limit about 35
PT (APT)			Seconds	7.7 – 13.8
Fibrinogen (Clauss)			g/l	2.32 – 5.04
APTT			Seconds	24.4 – 41.1

Transfusion Department

Request Form

The transfusion department request form is shown in figure 5.

Figure 5



THE QUEEN ELIZABETH HOSPITAL, KING'S LYNN NHS TRUST

POSITIVE PATIENT IDENTIFICATION AT SAMPLING IS ESSENTIAL (CHECK WRIST BAND OF INPATIENTS)
MINIMUM SAMPLE LABELLING REQUIRED = SURNAME, FORENAME, DATE OF BIRTH AND HOSPITAL NUMBER HANDWRITTEN ON SAMPLE.
Casualty numbers and addressograph labels are NOT acceptable on the sample.

IN ALL URGENT CASES CONTACT THE LABORATORY EXT 3782. OUT OF HOURS CONTACT BMS via SWITCHBOARD

BLOOD TRANSFUSION

Hospital Number
Surname
Forename(s)
Address
Date of Birth
ADDRESSOGRAPH

Diagnosis / Clinical Information. "PRE-OP", "LOW Hb" or "Anaemia" NOT ACCEPTABLE

Consultant: Private: Y / N
Location:
Previous Transfusion Yes / No Date:
Pregnancy (ies) Yes / No Details:
Known Antibodies Yes / No Specify:

LABORATORY REQUEST
1. Blood group and antibody screen (7ml EDTA): ☐
2. Direct Coombs (7ml EDTA and Clotted sample): ☐
3. Kleihauer Count (3ml EDTA) ☐ Date & Time delivered:

Blood will be available by Fast Issue if requirements have been met. (See Trust Transfusion Policy section 4.1)

Name of person completing form (CAPITALS):
Bleep/contact no.: Date:
Patient identified & blood taken by (CAPITALS):
Date & time sample collected:
Date & time sample received in lab:

REQUEST FOR BLOOD COMPONENTS

Units of Red Cells required: .....
Date and Time required: .....
Location for Transfusion: .....
Special Requirements NONE / CMV / IRRADIATED / OTHER
(See Trust Transfusion Policy section 5.4)

Reason for Red Cell Transfusion R1 - R7 (Turn overleaf for reasons)
R1 ☐ R2 ☐ R3 ☐ R4 ☐ R5 ☐ R6 ☐ R7 ☐

ALL REQUESTS FOR PLATELETS , FFP or CRYOPRECIPITATE PLEASE DISCUSS WITH LAB

Care should be taken to fill in the form correctly. All details are essential, and should be written in block capitals if patient demographic stickers are not available. Please enter sample type and date/time of collection, as well as pertinent clinical information. Please also state the requester and location you would like the results returned to. An accurate transfusion history, special requirements and number of products and location for transfusion is essential.

NB Areas highlighted in red are often not filled in and they should be to assist the transfusion safety process.

Transfusion Requests

Table 17 shows transfusion requests and specimen requirements.

Table 17

Test	Specimen(s)
Blood group, antibody screen, cross match	1 x lavender EDTA 6ml
Neonatal blood group, cross match	Paediatric EDTA
Child age >4 months	1 x lavender EDTA 3ml
Direct antiglobulin (Coombs) Test	Red top + 1 lavender EDTA 6ml
Kleihauer Test	1 lavender 3ml EDTA

Note: All specimen tubes MUST be labelled with 4 identifiers – patient's forename, surname, DOB, hospital number using the PDA system from within the QEH. Where the PDA system is not in use, it is acceptable to hand label the samples, with the statutory 4 points of identification.

If you wish to convert a group and screen to a cross match, please phone the laboratory on extension 3782.

Pre Admission Group & screen samples are kept for 28 days.

Specimen Time Constraints for Transfusion Samples

Timing of transfusion samples is dependent on the time/date of the latest transfusion. If a transfusion has taken place within the previous 3 months then a sample must be taken within the 48 hours prior to the start of transfusion and transfusion must be complete within 72 hours from the time of sampling.

If there has been no previous transfusion the blood can be issued and transfused for up to 1 week from the date of sampling.

Allow 1 clear working day for elective crossmatching. Crossmatched blood is routinely returned to stock after 24 hrs unless discussed with the laboratory.

Other Blood components and products available

For guidelines on use of blood and blood components and products, refer to the Trust Transfusion Policy & Procedure on the Administration of Blood and Blood Products available on intranet.

Fresh frozen plasma: Blood group specific; Order by phone, giving clinical disorder requiring the product. Volume issued is dependent on weight if patient. Allow 20 min for FFP to be defrosted in laboratory. Not used for reversal of warfarin

Cryoprecipitate: Blood group specific; Fibrinogen level required prior to request. Order by phone giving clinical disorder requiring product. Allow 20 min for defrosting.

Platelets: Blood group specific; usually available within 2-3 hrs. In emergency, within 2 hours.

Anti-D Immunoglobulin: For Rhesus negative woman, post delivery of Rh D positive child give 500iu. Kleihauer performed automatically. Ward will be informed if further dose of anti-D is required and the need for a further Kleihauer test. Following any sensitising event < 20 weeks gestation, give 250 iu anti –D; > 20 weeks 500 iu and a Kleihauer test should be requested.
Prophylactic anti D 1500 iu given at 28 weeks gestation.

Transfusion brief policy guide

All staff involved in the Transfusion process should be aware of the Trust Transfusion Policy

The Trust Transfusion Policy is detailed as:

- The Trust Transfusion Policy document is available in **all clinical areas**. It provides details of all Trust policies relating to Transfusion.

- Blood Transfusion is a potentially hazardous procedure, which should only be given when the clinical benefits to the patient outweigh the potential risks, the most important of these being Acute Haemolytic Reactions and Transfusion-transmitted Infections. Stringent procedures must be followed to ensure that the correct blood is given and that any adverse reactions are dealt with promptly and efficiently

- **This document has been developed using information from local and national audit, and National Guidelines. It incorporates recommendations from SHOT (Serious Hazards of Transfusion) Scheme, recently published Guidelines on Blood Transfusion Practice and Guidelines on the use of Blood Derivatives.**

- The Blood Transfusion Policy Document (Trust Transfusion Policy) is the responsibility of the Hospital Transfusion Committee who are required to formally review and, where necessary, update the document biannually. This procedure will be recorded in the minutes of the Hospital Transfusion Committee. The Trust Transfusion Policy is available on the Intranet. If any part of the policy is printed off, **it is the responsibility of senior staff in each department to check that any document complies with the most recent version.** In the event of computer failure, a hard copy of the Trust Transfusion Policy is available in the Transfusion Laboratory.

- **This is a Trust-wide policy and is relevant to all clinical workers involved in the blood transfusion process. Blood transfusions must be conducted within this Trust according to the procedures contained in this policy. Managers are responsible for ensuring that all staff who give blood transfusions have been assessed as competent in procedures which ensure that the correct blood is given.**

- **Annual Transfusion risk updates are mandatory for all clinical and non-clinical staff involved in the transfusion process from "vein to vein". Managers must ensure that evidence of competency is reviewed at appraisal.**

Transfusion Indication codes for requesting and prescribing blood components

Red cell concentrates

Acute Blood Loss
(British Committee for Standards in Haematology, 2001):-

R1. Objective: to maintain circulating blood volume and haemoglobin (Hb) concentration >7 g/dl in otherwise fit patients, and >9g/dl in older patients and those with known cardiovascular disease.
- *15-30% loss of blood volume (800-1500ml in an adult):* transfuse crystalloids or synthetic colloids. Red cell transfusion is unlikely to be necessary.
- *30-40% loss of blood volume (1500-2000ml in an adult):* rapid volume replacement is required with crystalloids or synthetic colloids. Red cell transfusion will probably be required to maintain recommended Hb levels.
- *>40% loss of blood volume (>2000ml in an adult):* rapid volume replacement including red cell transfusion is required.

Peri-operative Transfusion
(Association of Anaesthetists, 2001; British Committee for Standards in Haematology, 2001; Scottish Intercollegiate Guidelines Network, 2001):-

Many patients undergoing elective surgical operations should not require transfusion support if their Hb concentration is normal before surgery. Assuming Normovolaemia has been maintained, the Hb can be used to guide the use of red cell transfusion.
R2. Hb concentration below 70g/l.
R3. Hb concentration below 90g/l in-patient with known Cardiovascular Disease, or those with significant risk factors for Cardiovascular Disease (e.g. elderly patients, and those with Hypertension, Diabetes Mellitus, Peripheral Vascular Disease).

Critical Care
(British Committee for Standards in Haematology, 2001);

R4. Transfuse to maintain the Hb >70g/l.

Post-chemotherapy
R5. There is no evidence-base to guide practice. Use a transfusion threshold of a Hb of 9g/dl.
Radiotherapy
R6. Transfuse to maintain Hb above 100g/l

Chronic Anaemia
(British Committee for Standards in Haematology, 2001):-
R7. Transfuse to maintain the Haemoglobin just above the lowest concentration, which is not associated with symptoms of anaemia. Many patients with chronic anaemia may be asymptomatic with Haemoglobin concentration >80g/l.

FRESH FROZEN PLASMA (British Committee for Standards in Haematology, 2004)
(Dose – 12-15 ml/kg body weight equivalent to 4 units for an adult)

- **F1.** Replacement of single coagulation factor deficiencies, where a specific or combined factor concentrate is unavailable e.g. factors V.
- **F2.** Immediate reversal of warfarin effect, in the presence of life-threatening bleeding. (Not recommended – use factor concentrates).
- **F3.** Acute disseminated intravascular coagulation (DIC) in the presence of bleeding and abnormal coagulation results.
- **F4.** Thrombotic Thrombocytopenic Purpura (TTP), usually in conjunction with plasma exchange.
- **F5.** Massive transfusion, coagulation factor deficiency can be expected after blood loss of 1.5 x blood volume, aim for PT & APTT<1.5 of the control value.
- **F6.** Liver Disease, to correct bleeding or as prophylaxis before surgery when the Prothrombin time is >1.5 the control valve.

Cryoprecipitate (BRITISH COMMITTEE FOR STANDARDS IN HAEMATOLOGY, 2004)
(Dose – 1 unit/5kg body weight equivalent to 10 units for an adult)

- **C1.** Acute disseminated intravascular coagulation (DIC), where there is bleeding and a fibrinogen level <1g/l.
- **C2.** Advanced liver disease, to correct bleeding or as prophylaxis before surgery, when the fibrinogen level <1g/l.
- **C3.** Bleeding associated with Thrombolytic therapy causing Hypofibrinogenaemia.
- **C4**. Hypofibrinogenaemia (Fibrinogen level <1g/l) secondary to massive transfusion.
- **C5.** Renal failure or liver failure associated with abnormal bleeding where DDAVP is contraindicated or ineffective.

PLATELET CONCENTRATES (British Committee for Standards in Haematology, 2003; Consensus Conference on Platelet Transfusion, 1998; Schiffer et al for the American Society of Clinical Oncology, 2001).
(Dose – 15ml/kg body weight equivalent to 1 adult therapeutic dose for an adult).

- **P1**. To prevent spontaneous bleeding when the platelet count <10 x 10^9/l.
- **P2.** To prevent spontaneous bleeding when the platelet count <20 x 10^9/l in the presence of additional risk factors for bleeding such as Sepsis or Haemostatic abnormalities.
- **P3.** To prevent bleeding associated with invasive procedures. The platelet count should be raised to >50 x 10^9/l before lumbar puncture, epidural anaesthesia, insertion of intravascular lines, Transbronchial and liver biopsy, and Laparotomy, and to >100 x 10^9/l before surgery in critical sites such as the brain or the eyes.

Critical Care/Surgery

P4. Massive blood transfusion. The platelet count can be anticipated to be <50 x 10^9/l after 1.5-2 x blood volume replacement. Aim to maintain platelet count >50 x 10^9/l.

P5. Bleeding, not surgically correctable and associated acquired platelet dysfunction e.g. post-cardiopulmonary bypass, possibly combined with the use of potent anti-platelet agents such as Clopidigrel.

P6. Acute disseminated intravascular coagulation (DIC) in the presence of bleeding and severe thrombocytopenia.

P7. Inherited platelet dysfunction e.g. Glanzmanns Thrombasthenia with bleeding or as prophylaxis before surgery.

Immune Thrombocytopenia

P8. Autoimmune thrombocytopenia, in the presence of major haemorrhage.

P9. Post-transfusion Purpura, in the presence of major haemorrhage.

P10. Neonatal alloimmune thrombocytopenia, to treat bleeding or as prophylaxis to maintain the platelet count >50 x 10^9/l.

Specimen labeling

All forms and samples must be labelled with the patient's hospital number, surname and first name and date of birth. Patients who do not have a previous hospital number must be given an emergency registration number, which must be used on all samples and forms.

Do not use casualty numbers.

SAMPLES MUST BE LABELED BY PDA (or by hand from areas where the PDA system is not available)

NB. Samples without a hospital number and date of birth will be rejected, as will samples with addressograph labels on.

Haemolysed or clotted samples may be unsuitable for testing and will be rejected.

Emergency requests:

Where blood is required urgently, the laboratory MUST be notified as soon as possible and the appropriate correctly labelled samples sent to the laboratory. The urgency of the request must be clearly conveyed. In the case of massive blood loss see Hospital Transfusion Policy available on the intranet.

Procedure for the Collection of Blood from a blood bank

The procedure for collection of blood from a blood bank is available in the Trust Transfusion policy on the intranet. This procedure must only be carried out by staff who have completed the appropriate training and been assessed as competent

Procedure for the Administration of Blood

The procedure for administration of blood is available in the Trust Transfusion policy on the intranet. This procedure must only be carried out by staff who have completed the appropriate training and been assessed as competent.

Elective Surgery

- Pre-operatively any **correctable causes of anaemia** should be identified and treated accordingly. A full blood count 4-6 weeks before elective surgery allows detection of anaemia in time for the cause to be investigated and Iron replacement to take effect.

- Consideration should be given to a pre-operative course of **oral Iron** [Ferrous Sulphate 200 mgs 3 times a day] if tolerated, even in the absence of obvious Microcytic anaemia.

- A clinical history of **abnormal bleeding** (tooth extractions, surgery, Menorrhagia or a family history of bleeding) should be investigated.

- Measures to **minimise blood loss** at the time of surgery should be considered e.g. stopping Aspirin and NSAID if clinically acceptable at least 10 days prior to the operation.

- Patients on anticoagulants should be managed in accordance with Haematology Guidelines (Section A)

- **Peri-operative Cell Salvage:**
  In some situations this may be available to reduce requirements for transfusion of donor blood. Discuss with Consultant Surgeon and Anaesthetist.

- **Postoperative Cell Salvage**: This procedure is available for some patients undergoing Orthopaedic operations and should be discussed with the Consultant Surgeon and Anaesthetist.

- **Donor Blood** should only be used when there is no alternative and the patient has clinically symptomatic anaemia.

  <u>Procedures to Ensure Provision of Donor Blood for Surgical Patients:</u>

  - Details of procedure and timing of samples required in Section 4.1.

  - **It is the Clinician's responsibility to ensure that satisfactory samples have been received by the Laboratory, and that blood will be available on the date of operation.**

  - All requests for pre-operative transfusion work **MUST** state the nature of the operation and the likely date and time of surgery. This to ensure the Laboratory can make the necessary pre-operative checks and ensure that blood will be available at the time of the operation.

  - **Patients with atypical antibodies will require blood to be specifically ordered and therefore such cases should be discussed with the Laboratory prior to operations.** As much notice as possible will be required to enable us to provide compatible blood in such cases depending on the specificity of the antibodies. The Laboratory operates a surgical blood order tariff for such cases to ensure that sufficient blood will be available at the time of surgery.

b. **Policy for the Provision of Blood for Obstetric Cases**

1. **ELECTIVE AND EMERGENCY CAESAREAN SECTIONS**
   Blood for such cases can be made available by fast issue provided suitable samples are available in the Laboratory (see Section 4.1). **If an antibody has been detected in the mother during her antenatal monitoring, inform the Laboratory of the date and time of operation so that appropriate blood will be available for the mother and if indicated, for the baby. In a dire emergency 2 units of O Rh D Neg Kell negative blood are available in the Laboratory. Inform the Laboratory staff if this blood has been removed.**

2. **PLACENTA PREVIA/ACCRETA/PERCRETA**
   Compatible blood will be made available to Theatre (in a cold box) for such cases using electronic crossmatch unless antibodies are present [4 units for Previa, 8-10 units for Accreta/Percreta]. It is usual for a medical plan to be made in advance. Please ensure the Laboratory are included in such plans and kept informed of any changes (x3782).

Hospital Transfusion Department policy is to offer the fast efficient provision of blood to cover both operations and the use of red cells generally.
This procedure gives fast provision of blood when required and utilises the blood stocks as efficiently as possible.

The patient's group & antibody status is confirmed/checked by testing **two** samples taken at ***different*** times (i.e. a current sample and a historical sample) thereby eliminating the biggest risk, i.e. ABO incompatible transfusions due to error in blood sampling.
Details would normally be in the patient's laboratory record if they have been previously grouped and screened at the Queen Elizabeth Hospital since 1988.

When the patient is **first** seen and put onto the waiting list, the patient's laboratory record should be checked to see if they have been previously grouped and screened at the Queen Elizabeth. If the patient has not previously been investigated by the blood transfusion laboratory, **obtain a sample for group and screen at the first clinic visit**.

Current sample: when the operation has been scheduled, arrange for the patient to have their pre-operative bloods taken a ***maximum*** of 14 days prior to the operation. If the criteria for sample one have been fulfilled, then this preoperative sample will be the 'second' sample and the patient will therefore be eligible for fast issue electronic cross match. This sample must be in the laboratory by 2.30 pm on the day prior to the proposed date of morning operations and by 10.30 am on the day of afternoon operations.

By providing the laboratory with the two samples as stated, patients (except those with atypical antibodies) will be eligible for fast issue i.e. blood will be issued when required in theatre within 5 minutes of receipt of a telephoned request.

Telephone numbers for transfusion laboratory: extension 3782 and 2398, 8 am – 6 pm Mon-Fri. Out of hours 6 pm – 8 am and weekends, contact duty Haematology BMS via switchboard.

If the laboratory has NOT received two samples then fast issue blood via electronic cross match cannot be made available and in such cases formal cross match will be required according to the tariff. This will delay the provision of compatible blood.

All requests for pre-operative transfusion work MUST state the nature of the operation and the likely date and time of surgery. This is to ensure that the laboratory can make the necessary pre-operative checks and ensure that blood will be available at the time of the operation.

Patients with a history of transfusion or pregnancy within the last three months will require samples to be taken a MAXIMUM of 48 hours prior to likely transfusion to avoid the risks of newly developed antibodies.
Patients with **atypical antibodies** will require blood to be specifically ordered and therefore such cases MUST be discussed with the laboratory prior to operation.

Unusual cases should also be discussed with the laboratory.

Note that it is the clinicians' responsibility to ensure that the laboratory has received satisfactory samples and that blood will be available on the date of operation.

FOR PATIENTS GOING TO THEATRE OUT OF HOURS BLOOD SHOULD BE REQUESTED ACCORDING TO THE DISCRETION OF THE CONSULTANT

Transfusion Reactions

More detailed information is available in the Trust Transfusion Policy document

In the event of a possible transfusion reaction, a completed "request for investigation of suspected transfusion reaction" form (available in the Trust Transfusion Policy on the intranet) together with the following samples must be sent to the transfusion laboratory.

1 Bags of all transfused products given to the patient prior to and during the reaction.

2 6 mls EDTA blood sample

2 3 mls EDTA blood sample

4 Where possible, first specimen of patient's urine.

Turnaround time

The turnaround time for transfusion samples depends on the nature of the request being made.

As a routine all group and antibody screen requests will be reported within 12 hours of receipt. However this may be delayed by the presence of atypical antibodies and the possible need to refer to NHSBT

All requests for blood components will completed according to the time stated at request. Any urgent requests for blood components will be completed as soon as processing is complete and it is safe to do so.

Antenatal Sample testing will be completed within 1 week of receipt. This may be delayed if the sample is referred to NHSBT for antibody quantitation.

Sample referral

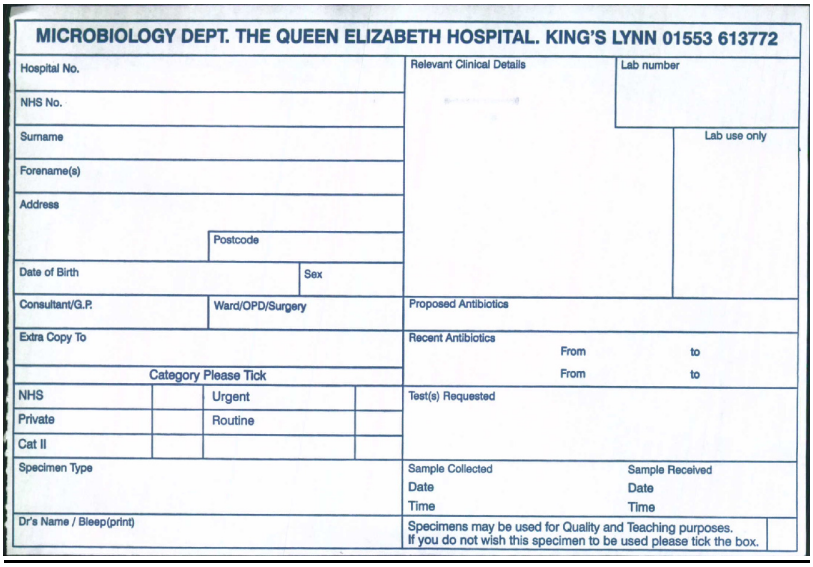
Occasionally samples are referred to NHSBT (The National Blood Service) when more complex testing is required. This will affect the sample turnaround time.

Medical Microbiology

Request Form

The microbiology department request forms are shown in figure 7.

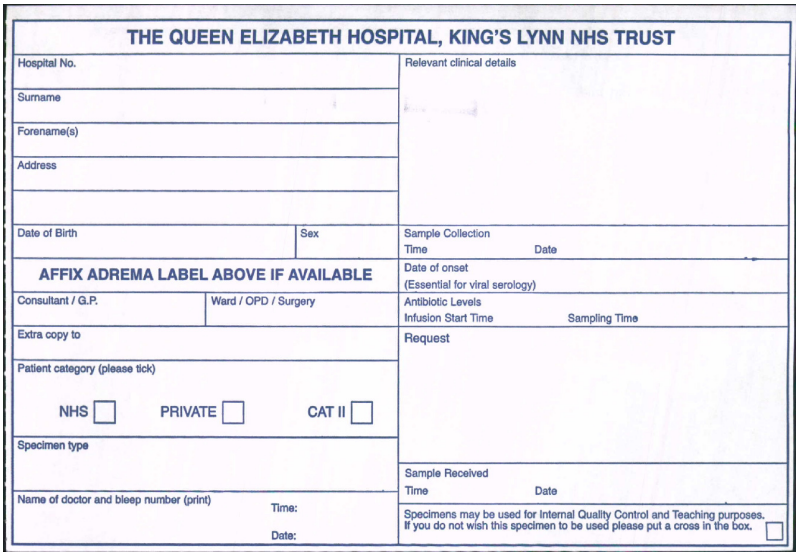
Figure 7



MICROBIOLOGY DEPT. THE QUEEN ELIZABETH HOSPITAL. KING'S LYNN 01553 613772

Hospital No.
NHS No.
Surname
Forename(s)
Address
Postcode
Date of Birth
Sex
Consultant/G.P.
Ward/OPD/Surgery
Extra Copy To
Category Please Tick
NHS
Private
Cat II
Urgent
Routine
Specimen Type
Dr's Name / Bleep(print)
Relevant Clinical Details
Lab number
Lab use only
Proposed Antibiotics
Recent Antibiotics
From to
From to
Test(s) Requested
Sample Collected
Date
Time
Sample Received
Date
Time
Specimens may be used for Quality and Teaching purposes.
If you do not wish this specimen to be used please tick the box.

Bacteriology Form



THE QUEEN ELIZABETH HOSPITAL, KING'S LYNN NHS TRUST

Hospital No.
Surname
Forename(s)
Address
Date of Birth
Sex
AFFIX ADREMA LABEL ABOVE IF AVAILABLE
Consultant / G.P.
Ward / OPD / Surgery
Extra copy to
Patient category (please tick)
NHS
PRIVATE
CAT II
Specimen type
Name of doctor and bleep number (print)
Time:
Date:
Relevant clinical details
Sample Collection
Time Date
Date of onset
(Essential for viral serology)
Antibiotic Levels
Infusion Start Time Sampling Time
Request
Sample Received
Time Date
Specimens may be used for Internal Quality Control and Teaching purposes.
If you do not wish this specimen to be used please put a cross in the box.

Serology/Virology Form

Care should be taken to fill in the form correctly. All details are essential, and should be written in block capitals if patient demographic stickers are not available. Please enter sample type and date/time of collection, as well as pertinent clinical information. Please also state the requester and location you would like the results returned to. Please also ensure that current antibiotic history is filled in.

Bacteriology, Serology & Virology forms are all coloured Blue. Requests for bacteriology must be made on a bacteriology form.
Requests for all other Serology/Virology tests, including antibiotic levels must be made on a Serology/Virology form.
A separate combined Haematology/Serology form is provided for routine Ante-natal screens

Consultants and senior staff:

Professor Lynne Liebowitz	Consultant Microbiologist	3627
Dr Sunil Sharma	Infectious Diseases Consultant	4360
Mr. Graham Rogerson	Chief Biomedical Scientist Microbiology	2876
Sandra Robinson	Senior Biomedical Scientist Microbiology	2486

General information

Opening Hours

Microbiology, Serology & Virology: Normal times for receipt of specimens are between 08:30 and 16:30 Monday to Friday.

Enquiries

Working hours

Microbiology medical advice	3627
Microbiology general enquiries	3772
Microbiology results	3772

Out of hours

Clinical advice	Contact via hospital switchboard
Technical advice	Contact via hospital switchboard

Please only bleep Microbiology out of hours for CSF specimens.

Laboratory Services

Urgent requests

Samples requiring urgent analysis require a prior telephone call.

During the normal working day any requests for urgent processing of specimens must be made by telephoning the appropriate section of the department,
Out of hours requests for urgent processing of specimens should be made to the on-call BMS.
Request forms MUST be clearly marked URGENT and MUST give details as to where results are to be telephoned.
Specimens must then be sent either via air tube (Not blood cultures, CSFs or unrepeatable specimens) to the Laboratory Office or, if out of hours, to the Blood Sciences specimen reception area.

Out of hours requests

Out of hours service

On Saturdays the laboratory is open in the mornings from 09:00 - 11:00 am for urgent bacteriology work only. For the remainder of the weekend and on bank holidays a Biomedical Scientist (BMS) from the Bacteriology Section will attend the laboratory each day to process urgent work and continue the processing of previously received work.
All specimens for bacteriology should ideally be tested immediately after collection. Although most samples will keep for up to 24 hours in the correct conditions, results will not be as reliable as those for fresh specimens. Therefore out of hours sampling should be limited where possible to:

1. Samples which are unrepeatable e.g. immediately before antibiotic therapy or during surgery.

2. Samples whose results will directly affect the management of the patient before the next routine working period.

One BMS from the Bacteriology Section attends the laboratory each evening to process any urgent/emergency bacteriology work which arrives in the laboratory before 21:00.

Serology/Virology specimens sent out of hours will be processed the next working day.

Meningitis

A BMS is available on call at all times to examine specimens for the diagnosis of meningitis and meningococcal disease.

High Risk Patients - Danger of Infection

Advice from Microbiology staff should be sought from the outset in the case of investigation of patients from High Risk Groups. All samples and request forms must be clearly labelled 'Danger of Infection'.
This applies to all specimens suspected of containing hazard group 3 or 4 organisms. The list of organisms requiring special precautions are detailed in table 20.

Table 20

Mycobacterium spp.	Rickettsia spp.
Salmonella typhi & paratyphi	Brucella spp.
Coxiella burnetti	Chlamydia psittaci (avian strains)
Treponema pallidum	Leptospira icterohaemorrhagia
Blastomyces dermatitidis	Coccidioides immitis
Histoplasma spp.	Trypanosoma cruzei
LCM viruses	Hepatitis B virus
Haemorrhagic fever viruses	Hepatitis C virus
Human Immunodeficiency virus	Lassa virus

This list is by no means exhaustive; if in doubt about the status of a patient please contact microbiology staff.

Specimen Reception

During normal working hours, (08:30 to 16:30 Mon to Fri) specimens may either be sent by air tube (Not blood cultures, CSFs or unrepeatable specimens) or sent to the Laboratory Office. Please send specimens as early in the day as possible.

Outside normal working hours, specimens must be left in the Blood Sciences Specimen Reception Area.

- Urines should be refrigerated.
- Blood Cultures should be placed in the 35°C incubator.
- All other specimens should be left in the Blue box at room temperature.

Every effort will be made to ensure that all specimens received by 21:00 are processed on the day of receipt.

Results

All results can be found on the APEX Laboratory Computer System as soon as they are available. Microscopy results (Urines, CSF, AAFB and Gram Stains) are available on the Computer as soon as they have been done.
Serology/Virology, Culture and (if indicated) sensitivity results are available immediately after Clinical Authorisation on Ward VDUs and for electronic reporting to GP surgeries.
Hard copies of all reports are also available.

Time limits for requesting additional examinations

Microbiology specimens are retained for the following time periods after processing, additional examinations may be requested at any time during that period. Initially please contact the laboratory by telephone to check that there is sufficient specimen remaining.

Please note
1. Microbiology specimens will often deteriorate with time, so if further examinations are required, then if possible it is better to submit a fresh specimen.
2. In some cases all of a specimen will have been used.

Specimen	**Retained for**
Urines	1 day
CSF	4 weeks
Other bacteriology specimens	6 days
Mycology specimens	3 weeks
Antenatal Serology Specimens	2 years
Genito-urinary Medicine serology Specimens	2 years
Needlestick injury serology specimens	2 years
Other Serology/Virology specimens	4 weeks

All Cultures which have sensitivity tests perfomed are held for 6 days, further antibiotic testing may be requested during that time by contacting one of the Microbiology Consultants

Bacteriology Specimens

This section is intended only to give a quick guide, for more detailed information please contact the laboratory (ext 3772). Table 21 outlines specimen requirements for microbiology specimens. If possible, specimens for Bacteriology should be taken before commencement of antibiotic therapy.

Table 21

Specimen	Collection	Container	Storage	Routine Tests	Turn around time	Notes
Urine	Midstream urine (MSU)	Sterile screw capped universal container	Refrigerated	Quantitative microscopy Culture Sensitivity testing if indicated	1 day	Specimens should be pre-screened at source for nitrites & leucocytes. If negative - unlikely to be infected
Sputum	Saliva is not acceptable. Keep oral contaminatio n to a minimum.	Sterile screw capped universal container	Room temperature	Gram Stain Culture Sensitivity testing if indicated.	2-3 days	Delay in processing may adversely affect results
Fluids, Aspirates & Tissues	For aspirates please send as much as possible (up to 20mls)	Sterile screw capped universal container	Room temperature	Gram Stain Culture Sensitivity testing if indicated.	2-3 days (Anaerobe cultures are incubated for 4 days)	Delay in processing may adversely affect results
Pus	For aspirates please send as much as possible (up to 20mls)	Sterile screw capped universal container	Room temperature	Gram Stain Culture Sensitivity testing if indicated.	2-3 days (Anaerobe cultures are incubated for 4 days)	Delay in processing may adversely affect results
Genital swabs	Candida, Trichomonas - HVS in Amies medium serious GTI – Cervical / Urethral swab in Amies medium Bacterial vaginosis - smear of the discharge	Transport Swab	Room temperature	Culture Sensitivity testing if indicated. Trichomonas culture will be set up if requested Gram Stain for Bacterial vaginosis	2-3 days (Anaerobe cultures are incubated for 4 days)	Delay in processing may adversely affect results

Specimen	Collection	Container	Storage	Routine Tests	Turn around time	Notes
Other swabs (Wound, Skin, Ear, Nose, Throat, Eyes etc)	Ensure that there is adequate material on the swab, and that contamination is reduced to a minimum. For example in leg ulcers the ulcer should be cleaned with normal saline and a swab taken from the leading edge	Transport Swab	Room temperature	Culture Sensitivity testing if indicated.	2-3 days (Anaerobe cultures are incubated for 4 days)	Delay in processing may adversely affect results
MRSA Colonisation Screen	Nose and Axilla swabs Selective Mannitol Broth	Break both swabs into one laboratory supplied bottle of MRSA broth	Room temperature	Culture Sensitivity testing if indicated	1 – 2 days	Delay in processing may adversely affect results
Blood cultures	See Blood culture collection policy	Laboratory supplied Aerobic and Anaerobic Bottles, or Paediatric Bottle	Transport immediately to the laboratory. Out of Hours specimens must be placed in the Incubator in the Blood Sciences dept. reception area	Culture Sensitivity testing if indicated	2-3 days. Blood cultures are routinely incubated for 5 days	
IV Catheter	Cut off 2-	Sterile screw	Room temperature	Culture	2-3 days	

Specimen	Collection	Container	Storage	Routine Tests	Turn around time	Notes
Tips	3cm from the tip	capped container		Sensitivity testing if indicated		
Faeces	A walnut sized piece of faeces or (10ml if liquid)	Sterile screw capped container	Room temperature	Wet film for Giardia Culture - according to clinical details Clostridium difficile toxin testing if indicated Ova cyst & parasite screens if indicated	Cultures 2-3 days. Cl difficile toxin testing – same day if received by 10:00 am	Appropriate tests will be performed based on Age, Clinical details, Specimen source and consistency
Cerebro Spinal Fluid (CSF)		Sterile screw capped container	Do not use the air tube system Keep at room temperature	Red and White Cell Counts (White cell differential if indicated) Gram and ZN stains (if indicated) Culture Sensitivity testing (if indicated)	2 days. Microscopy available within 2 hours of receipt.	If PCR, virology or other tests required, please discuss with the Consultant Microbiologist
Mycobacteria	Pulmonary infections - 3 specimens of Sputum Renal infections - 3 MSU specimens of 20 mls each taken on consecutive days Other sites - please send as large as specimen as possible (up to 20mls)	Sterile screw capped container.	Refrigerated	Microscopy Culture Sensitivity testing if indicated.	Microscopy 3-4 days Culture 6-8 weeks	T Spot tests Only if approved by Microbiology Consultant. Only available Monday to Thursday. Must be arranged at least 24hrs in advance
Mycology	Scrapings	Dermapak – available from the laboratory	Room temperature	Microscopy Culture	Microscopy 3-4 days Culture 3	

Specimen	Collection	Container	Storage	Routine Tests	Turn around time	Notes
					weeks	

Serology

The list of available serology tests are shown in table 22 below. Any tests not shown should be discussed with the relevant department

Table 22

Test Group	Tests	Purpose	Specimen	Turn around time
Hepatitis screening serology	Hepatitis B Surface Antigen Hepatitis C antibodies Hepatitis A antibodies	Evidence of current viral hepatitis infection. *Date of onset required.*	**Serum**	1-2 days
Hepatitis B antibodies	Anti-HBs Anti-HBc total antibodies	Seroconversion check following hep B vaccine. To provide evidence of past HBV infection	**Serum**	1-2 days
HIV	HIV antibody/antigen	Evidence of HIV infection	**Serum**	1 day
Antenatal screening	Rubella IgG Hepatitis B s antigen HIV antibody/antigen Syphilis antibodies	Immunity to rubella check & screen for HBV, HIV and syphilis infections *(yellow antenatal form)*	**Serum**	3 days
Syphilis serology	*Treponema pallidum* antibodies	Evidence of past or recent syphilis infection	**Serum**	3 days
Cytomegalovirus serology	CMV IgG CMV IgM	Evidence of past or current CMV infection *Date of onset required*	**Serum**	5 days
Varicella zoster virus serology	VZV IgG	Evidence of immunity to VZV *Date of contact required*	**Serum**	2 days
Toxoplasma serology	*Toxoplasma gondii* antibodies	Evidence of past/recent Toxoplasma infection *Date of onset required*	**Serum**	3 days
Lyme disease serology	*Borrelia burgdorferi* antibodies	Evidence of past/recent Lyme disease *Date of onset or of tick bite required*	**Serum**	3 days
Infectious mononucleosis serology		*Please send sample for full blood count to Haematology Lab*		
Streptococcal serology	ASO antibodies	Evidence of recent streptococcal infection *Date of onset required*	**Serum**	2 days
Respiratory syncitial virus	RSV antigen	Detection of RSV in nasopharyngeal secretions *Please deliver to Pathology Reception*	Naso-pharyngeal aspirate	2 hours
Chlamydia	PCR for *Chlamydia trachomatis* DNA	Detection of *C.trachomatis* in urine, genital and eye specimens	Cervix swab Urethral swab First void	2 days

			urine Eye swab	
Gastroenteritis viruses	Rotavirus antigen Norovirus antigen	*Please refer to bacteriology manual*		
Antibiotic assays	Gentamicin levels Vancomycin levels	The monitoring of antibiotic levels *The times of dose and of sample required*	**Serum**	1 day

Table 23 below shows the virology tests referred to other sites. For any tests not listed please contact the laboratory 01553 613772

Table 23

Referred Virology	Tests	Purpose	Specimen	Turn-around time
Referred viral serology	Respiratory viral antibodies Measles IgG CMV IgG HSV IgG VZV IgG	Atypical pneumonia *Date of onset required* The determination of viral immunity in haematology patients	**Serum**	1 – 2 weeks
Referred bacterial serology	*Pseudomonas* Ab *Bordetella* Ab Anti-DNase B Ab	The investigation of some bacterial infections *Date of onset required*	**Serum**	1 – 3 weeks
Legionella urinary antigen (referred)	Legionella urinary antigen	Investigation of *Legionella pneumophila* infection Must be within one week of onset *Date of onset required*	Urine within 1 week of onset	1 day
Virus culture (referred)	Culture of mucosal sites Culture of faeces	The detection of HSV and enteroviruses	Swab in virus transport medium Faeces	2 weeks
Viral PCR (referred)	PCR for HSV/VZV PCR for enteroviruses PCR for HIV PCR for CMV PCR for hepatitis C PCR for other viruses	Investigation of viral encephalitis and meningitis Investigation of congenital HIV, CMV reactivation, HCV infection and others	CSF Purple-top EDTA blood	1 – 2 weeks
HIV viral load (referred)	Quantitative HIV RNA	The monitoring of HIV infection	Purple-top EDTA blood	1 –2 weeks
Pneumocystis	*Pneumocystis carinii* cysts	To provide evidence of PCP infection in immunodeficient patients	Bronchial washings Induced sputum	1 – 3 days

Reference laboratories

Test	Reference Laboratory
Adenovirus (CFT)	Norfolk & Norwich University Hospital Microbiology Dept. NRP Innovation Centre, Norwich Research Park, Colney, Norwich NR4 7GL Tel #6474 (QEH Internal) 01603 611816
Adenovirus antigen	
Adenovirus antigen test	
Adenovirus DNA:	
Anti HBc total	
Anti-Dnase B	
AVIAN PRECIPITINS:	
Br.melitensis (aggn test)	
Brucella abs (CFT)	
C.burnetii (CFT)	
Chlamydia (CFT)	
CMV (CFT)	
Coxsackie B	
Enterovirus	
Enterovirus (CFT)	
Erythrovirus B19 IgG	
HBsAg (confirmatory)	
Hep B 'e' markers	
Hepatitis C abs:	
Herpes simplex PCR	
Herpes simplex virus (PCR)	
HIV 1/2 antibody assay	
Influenza A (CFT)	
Influenza A antigen	
Influenza B (CFT)	
Influenza B antigen	
Legionella (CFT)	
Legionella antibody EIA	
Leptospira	
Leptospira (CFT)	
M.pneumoniae (CFT)	
mycoplasma	
P.carinii (IF)	
Parainfluenza (CFT)	
Parvovirus IgG & IgM	
Rubella IgM	
Torch screen + as required	
Viral Load tests	
Viral Respiratory screen	

Test	Reference Laboratory
CMV Viral Load	Clinical Microbiology and Public Health laboratory (Health Protection Agency), Box 236, Addenbrooke's Hospital, Hills Road, Cambridge CB2 0QQ Tel: 01223 257034 Fax: 01223 242775 Out of hours Tel: 01223 245151
Coronavirus DNA	
Cytomegalovirus DNA:	
Enterovirus RNA:	
Epstein Barr virus DNA:	
Erythrovirus B19 IgM	
Hep B DNA	
Hepatitis A IgG	
Hepatitis A IgG	
Hepatitis C Virus genotype:	
Hepatitis C virus RNA	
Herpes simplex IgG	
Herpes simplex IgG	
Herpes simplex virus DNA:	
Influenza A & B Virus PCR	
Influenza A RNA	
Influenza B RNA	
Measles virus RNA:	
Menigococcal PCR	
Metapneumovirus RNA	
Mumps IgM	
Mumps virus RNA:	
Mumpsvirus IgM	
P.carinii PCR	
Parainfluenza group RNA	
PCR	
PCR for Respiratory Viruses:	
Polyomavirus BK DNA	
Polyomavirus JC DNA:	
Respiratory Virus PCR	
Rhinovirus RNA	
RSV RNA	
Rubella abs referred	
Rubella IgM	
Varicella zoster virus DNA:	

Test	Reference Laboratory
HIV resistance testing	Birmingham HPA, Antiviral Resistance Testing Service, WMPHL, Heart of England Foundation Trust, Bordesley Green East, Birmingham B9 5SS Tel: 0121 424 2256
Rapid Plasma Regain (RPR)	HPA Regional Laboratory, Bristol Myrtle Road Kingsdown Bristol BS2 8EL Tel: 0117 342 5551
Referred syphilis serology	
Syphilis IgG ELISA	
Syphilis IgM ELISA	
T.pallidum particle aggn.	
VDRL slide test	
Cryptococcus antigen test:	HPA Regional Laboratory, Bristol Myrtle Road Kingsdown Bristol BS2 8EL Tel: 0117 342 5028
Histoplasma immunodiffusion	
Histoplasma CFT Mycelial Ag	
Histoplasma CFT Yeast antigen	
Farmers lung ppt.	
Hepatitis E IgG	HPA Colindale, Cfl (VRD), HPA Cfl Colindale 61 Colindale Avenue London NW9 5HT Tel: 020 8327 6017/6266
Hepatitis E IgM	
HHV 6&8 (Human herpes virus)	
Hep D antibodies	
HIV Proviral DNA PCR	
Maternal transmission	
HTLV (Human T-lymphotropic virus)	
B.quintana IgM/Cat scratch	HPA Colindale Cfl (RSIL), HPA Cfl Colindale 61 Colindale Avenue London NW9 5HT Tel: 020 8327 7331
B.henselae IgG/Cat scratch	
B.henselae IgM	
B.quintana IgG	
B.pertussis IgG	
B.pertussis	
Pseudomonas abs.	HPA Colindale, SRMD (LHCA), HPA Cfl Colindale 61 Colindale Avenue London NW9 5HT Tel: 020 8327 7241
Anti staphylococcus abs	
Anti streptococcus abs	
Troph. whippelii DNA:	MICROPATHOLOGY Ltd University of Warwick Science Park, Barclays Venture Centre Sir William Lyons Road, Coventry CV4 7EZ. 012476 323222
M tuberculosis PCR	HPA National Mycobacterium Reference Laboratory Abernethy Building Institute of Cell and Molecular Science (ICMS) 2 Newark Street London E1 2AT Tel: 020 7377 5895
Meningococcus	Meningococcal Reference Unit (Men RU) Manchester Clinical Science Building Manchester Royal Infirmary Oxford Road Manchester M13 9WZ Tel: 0161 276 6757
Mycobacteria Culture	James Paget University Hospitals NHS Foundation Trust Lowestoft Road, Gorleston, Great Yarmouth, Norfolk, NR31 6LA Main switchboard: 01493 452452
Bacterial Identification	Laboratory of Gastrointestinal Pathogens HPA Centre for Infections 61 Colindale Avenue London NW9 5EQ Tel: 020 8327 7116
Mycology Reference	SouthWest HPA Laboratory Myrtle Road Kingsdown Bristol BS2 8EL Tel: 0117 342 5028
Leptospira	Leptospira Reference Unit (LRU) Department of Microbiology and Immunology County

	Hospital Hereford HR1 2ERT Tel: 01432 277707
T SPOT TEST	Oxford Immunotec, 94 Milton Park, Milton, Abingdon, Oxfordshire - Tel: 01235 442780
Dengue fever	Porton Down Salisbury Wiltshire SP4 0JG 01980 612 100
Rickettsial	
Ross river	
B. burgdorferi abs	Lyme Borreliosis Unit (Lyme RU) Southampton Southampton Laboratory Level B South Laboratory Block Southampton General Hospital Southampton SO16 6YD Tel: 023 8079 6408
Antibiotic levels	The Regional Antimicrobial Reference Laboratory, Department of Medical Microbiology North Bristol NHS Trust Southmead Hospital Bristol BS10 5NB Tel: 0117 959 5653
Toxoplasma IgM	Toxoplasma Reference Laboratory Singleton Hospital Swansea SA2 8QA 01792 285055
Toxoplasma DNA:	
Toxoplasma IgM etc	
CYSTICERCOSIS SCREEN/ HYDATID	Department of Clinical Parasitology Hospital for Tropical Diseases Mortimer Market Capper Street London WC1E 6AU Tel: 020 7387 4411
Toxocara abs	
Amoebiasis serology	
Schistosomal antibodies (bilharzia	
Amoebic FAT	

Notification of Infectious Diseases

Please consult the Trust Policy - **Duty to notify suspected disease, infection or contamination in patients**

Infection Prevention and Control Service

Appropriate advice on infection control issues for Trust staff will be facilitated by members of the Infection Prevention and Control Service.

Relevant Infection Control guidelines and policies are located on the Trust Intranet

Members of staff may require advice on infection control issues relating to:

Clinical issues e.g.

- Source isolation
- Protective isolation
- Patients with infections
- Staff contact with infectious diseases
- Outbreak management
- Exposure to microbiological hazards

Environmental issues e.g.

- Decontamination of environment / equipment
- Spillages
- Waste management
- Food hygiene

The Infection Prevention and Control Service will provide appropriate education for all Trust employees as appropriate and negotiated with departmental heads.

Cellular Pathology

Consultants and Senior Staff

Name	Grade	Extension
Dr. Lilani Ranasinghe	Consultant Histo/Cytopathology	3624
Dr. Phuoc Tan Diep	Consultant Histo/Cytopathology	2483
Dr Roshina Ahmed	Consultant Histo/Cytopathology	…….
Ann Hennessey	Cellular Pathology Manager	3431
Mr Mike Davies	Senior BMS Histology	3617
Mr Jeff Hammond	Senior BMS Histology	3617
Mrs Lynne Macmillan	Senior BMS Cytology	3020
Mr Dave Spooner	Lead Anatomical Pathology Technician	2561
Marie Ford. Brenda Gerrish	Bereaved Relative Support	3878

E-MAIL: Pathology staff can be e-mailed at: forename.surname@qehkl.nhs.uk

General information

Clinical advice can be sought from a Consultant Histopathologist, contact details in the table above. Additional tests on specimens can be requested: If out of hours advice is required please contact switchboard.

- **Non Gynae cytology – within 24 hours.**
- **Surgical specimens – No time limit for processed blocks and slides. Please discuss with a Consultant Histopathologist.**

All requests for slides or blocks to be reviewed or discussed at an external MDT must be either requested by fax or a letter from the reviewing Consultant. This measure has become necessary to prevent slides and blocks becoming lost in transit and to provide an audit trail of the material. No requests will be accepted over the phone or via e-mail. Please ensure these requests are received in the laboratory promptly

Laboratory working hours

Mon	Tue	Wed	Thurs	Fri	Sat	Sun	BH
← 07.30 – 17.30 →					No on call service		

Out of hours

Consultant on call (via Hospital Switchboard) → 01553 613613

Enquiries

During Working Hours

Results (Histology)	3617
Results (Cytology)	3020
Frozen sections (Histology Lab)	3617
Histology FAX	01553 613070
Cellular Pathology Manager	3431
Cytology	3020
Mortuary: Mr Dave Spooner	2561
Bereaved Relative Support	3878

Out of hours

Please contact the Hospital switchboard. 01553 613613

Reporting Times

Reporting time working days.	Category
(immediate – 30mins)	Frozen sections Intra-operative sentinel lymph node imprints
(6 hrs – 24 hrs)	Urgent/same day biopsies (without complete immunohistochemistry IHC) Urgent non-gynaecological cytology
(24 hrs – 72 hrs) A preliminary report will normally be available within 24 hours.	In-patient biopsy/non-gynaecological cytology (with complete IHC) Surgical resection specimens (urgent)
(48 hrs – 1 week)	Out-patient and GP biopsies Surgical resection specimens (routine)
(>1 week)	Specialist external referrals Highly complex cases Decalcification specimens Adjunctive molecular testing (HER2 testing currently referred to Addenbrookes)
24-48 hours	Infertility and Post vasectomy

Histopathology

Histology Request Form

Leave this space free *Laboratory use only* *Thank You*		**Queen Elizabeth Hospital Kings Lynn NHS Trust**	
NHS Number		**Department**	**Cellular Pathology**
Hospital Number		**Request Type**	**Surgical/Cytology/ / Post Mortem/ Synovial Fluid/ Immunofluoresence**
Surname		**Category**	**Routine/Urgent/Date of Clinic**
Forename		**Clinical Details**	
Sex	**DoB**		
Address			
Address			
Address			
Post Code			
Consultant/ GP		**Gynae Cases**	**Hormones / Cycle / LMP**
Hosp/Ward/Practice		**Date & Time of Request**	
Patient Category	**NHS/GP/Sandringham**	**Date and Time of Receipt**	

In accordance with Trust Policy, all reports will be sent to the secretary of the Consultant.

Please leave the area below blank for laboratory use, thank you

Care should be taken to fill in the form correctly. All details are essential, and should be written in block capitals if patient demographic stickers are not available. Please enter sample type and date/time of collection, as well as pertinent clinical information. Please also state the requester and location you would like the results returned to.

Submission of Diagnostic Surgical Histopathology Specimens

Accurate patient details and salient points of history are essential.
For example: date of the first day of LMP should be indicated with endometrial curettings.
A completed request form must accompany each patient's sample; each specimen must display an addressogram label containing the patients name and date of birth
Always provide clear information regarding "HIGH RISK" specimens (Hepatitis, HIV, TB etc). The request form and specimen container MUST have a High Risk Sticker attached.

Please state if the sample is urgent on the request form.

Treatment of Specimens

Most specimens should be submitted in adequate 10% neutral buffered formalin sufficient to cover the specimen (the minimum amount of formalin is 10x the volume of the specimen as a general rule). Fixation must be done without delay and with the least amount of handling.
Specimens which are allowed to dry are thereby rendered useless. When possible, large specimens should be incised to allow proper fixation.

In problematic or unusual cases or in special circumstances please discuss with a Consultant Histopathologist.

Frozen Sections

Frozen sections must be by prior arrangement with Consultant Histopathologist.
Please ensure that:

- Transport the dry specimen to the laboratory promptly
- Hand the specimen over to a member of the laboratory staff
- Ensure there is a theatre extension number on the request form
- All the details on the form and specimen are correct.

Frozen section result should be available between 15 – 20 minutes from receipt of specimen.

Immunofluorescence

Tissue transport media is available from the laboratory for all samples requiring Immunofluorescence studies. General Practioners should request transport media at least 1 week prior to the procedure to allow for delivery. The media should be stored at 4 – 8 degrees Celsius in a refrigerator. Do not place the specimen in formol saline. If no transport media is available the specimen can be stored in normal saline for transport purposes. For Immunofluorescence the turnaround time will be 7 -10 days.

Semen Analysis

Semenology Request Form

REQUESTING CLINICIAN TO COMPLETE	LABORATORY NUMBER:

(Please use Adrema labels where possible)
HOSPITAL NO----------

NAME----------

DATE OF BIRTH---------- ----

ADDRESS----------

CLINIC/GP PRACTICE ----------

CONSULTANT/GP----------

CLINICAL INFORMATION &
REASON FOR INVESTIGATION

PLEASE TICK:-

☐ INFERTILITY

☐ POST VASECTOMY

☐ VASECTOMY REVERSAL

****** THE POT MUST ALSO BE LABELLED WITH THE PATIENTS NAME ******
******AND DATE OF BIRTH ******

INSTRUCTIONS TO PATIENTS

IT IS IMPORTANT THAT YOU DO NOT HAVE INTERCOURSE OR EJACULATE FOR 3-5 DAYS PRIOR TO SAMPLE PRODUCTION.
YOU MUST PRODUCE A SPECIMEN OF SEMEN, NOT URINE, IN THE CONTAINER PROVIDED BY YOUR DOCTOR OR CLINIC.
DO NOT USE A CONDOM TO COLLECT THE SPECIMEN
YOU MUST KEEP THE SPECIMEN AT BODY TEMPERATURE UNTIL IT IS HANDED OVER AT THE HOSPITAL (FOLLOW THE SIGNS TO PATHOLOGY RECEPTION)

QUESTIONS 1-6 BELOW MUST BE COMPLETED BEFORE ATTENDING YOUR APPOINTMENT

1. DATE SPECIMEN PRODUCED: ----------
2. TIME OF PRODUCTION: ----------
3. WAS ANY OF THE SPECIMEN LOST OR SPILT YES / NO
4. I HAVE NOT HAD SEXUAL INTERCOURSE (OR EJACULATED) FOR AT LEAST --------- DAYS.
5. I CONFIRM THAT I HAVE KEPT THE SPECIMEN AT BODY TEMPERATURE SINCE PRODUCTION i.e. COAT POCKET YES / NO

PATIENTS/REPRESENTATIVES SIGNATURE----------

FOR LABORATORY USE ONLY

RECEIVED BY: **DATE & TIME RECEIVED:**

The request must be completed by the clinician including the reason for the analysis. The patient must complete questions 1-6. The laboratory supplies semen analysis packs which includes a sterile tamper proof specimen container, request form and patient information leaflet. If you require information in other languages please contact the laboratory.
The service is by appointment only on Wednesdays and Thursdays between the hours of 0830-1600. If semen analysis is required outside of these hours please contact the laboratory on 3757 to arrange a convenient time.

Specimen Rejection Criteria

- The specimen has leaked or shows evidence of leaking.
- The specimen has not been produced in the container supplied by the laboratory.
- The specimen has been produced using a condom.
- The specimen is not handed over by the patient or the patient's representative who is able to confirm the instructions for production have been adhered to.
- The specimen has not been delivered within the stated time frame.
- The specimen has been produced by *Coitus interupptus*.

Post-vasectomy:

Two sequential semen samples, which are reported as being clear of spermatozoa on microscopy are required before contraception can cease. The recommended sampling intervals are 12, 16 and 24 weeks post operation. The requirement for further samples to confirm the absence of spermatozoa is not unusual. The report will contain information regarding the presence or absence of spermatozoa, if present the report will state if the spermatozoa are motile or non-motile. Please ensure that the patients have sufficient packs for at least 3 tests, further packs can be obtained from Pathology reception or the Histology laboratory.

Semen Specimens for infertility

Specimens must be brought to pathology reception as soon as practicably possible, ideally within one hour. The specimen must be kept warm during transit, the sample can be kept warm in a pocket, do not over heat the specimen, body temperature is ideal.

The Report

The report will contain the following information:

- Time Produced
- Time received
- Time examined
- Liquefaction. Complete/incomplete
- Volume (ml)
- pH
- Presence of white blood cells
- Count (million per ml of ejaculate)
- Total Motility (all spermatozoa which are motile)
- Non motile.

The report will be issued on the same day. If advice is required concerning the report or the specimen, please ring the Andrology Lead Karen Ashurst.

Reporting times.

The report will be clinically authorised within 2 days of the analysis. Patients must not ring the laboratory for results.

The laboratory participates in the National Quality Assurance Scheme for Andrology.

Reference Values of Semen Variables (WHO 2010 manual 5th Edition).

Semen variable	Reference level	Lower reference limit
Sperm Concentration	15 million per ml	12-16 million per ml
Total sperm number per ejaculate (millions)	39	33-46
Total Motility %	40%	38-42 %
Morphology Normal forms	4%	3-4 %
Volume ml	1.5	1.4-1.7
pH	>7.2	

Crystal microscopy

This test is for the identification of uric acid and calcium pyrophosphate crystals in joint fluids. Please send the aspirate in a plain universal container and dispatch to the laboratory on the same day. If further analysis is required, for example culture and sensitivity, please indicate on the request form. Please refrigerate the sample at 2-8 degrees Celsius.

Cytogenetics

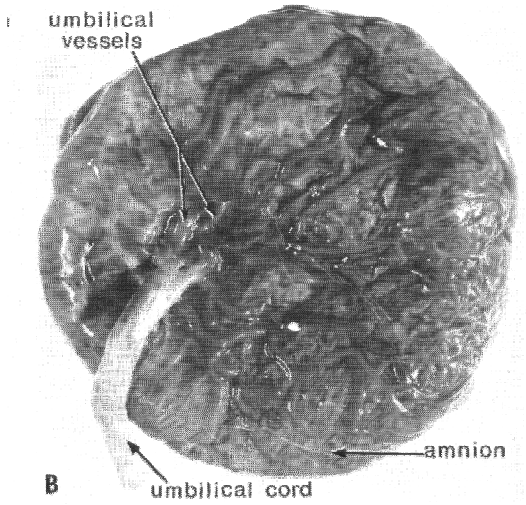
The laboratory refers all samples requiring cytogenetic analysis to the Regional Genetics Laboratory in Cambridge. The transport media required for the sample can be obtained from the Histopathology laboratory upon request. Only a small stock is kept so it is necessary to contact the laboratory in advance. Specimens destined for cytogenetic analysis must be received dry unless the tissue is already in transport media. If histology is also required please send the specimen dry and laboratory personnel will select the appropriate tissue and dispatch to Cambridge. All specimens must be accompanied by the orange cytogenetics request form, if Histology is also required, a separate Histology request form must be submitted with the specimen.

Products of conception must only be taken to the Mortuary if they are for disposal only. The transport of samples to Cambridge will be as soon as possible via courier or other hospital transport. If the specimen is to be taken out of hours please place the specimen in a standard fridge or arrange to collect transport media from the laboratory.
It is crucial that a sample destined for cytogenetics is received promptly.

POSTNATAL TISSUE SAMPLES FOR CYTOGENETIC STUDIES

(KARYOTYPING) FOLLOWING PREGNANCY LOSS OR TOP

- Please ensure that a biopsy of placenta approximately 2 cm^2 in size is taken using sterile forceps and scissors.
- Take the sample from close to the cord insertion site to ensure that it is foetal in origin.
- Include membranes and underlying villous material.
- Place the placental sample in a universal containing 5ml of tissue transport media (available from laboratory), accurately labelled with the sample type, patient name, date of birth, hospital number and date of sampling.



Products of conception

- We would prefer that the **whole products of conception sample** be sent to us for complete examination.
- If Histopathology assessment is required
  Please ensure that a Histopathology request form is included with the Cytogenetics referral card.

IUD or macerated fetus

Send a placental biopsy only. Where fetal death has occurred 'in utero', fetal skin samples have a very high failure rate (ACC Working Party Report, 1995).

.

Fresh spontaneous abortion or termination of pregnancy where the fetus is known to structurally abnormal

Send fetal skin and placental biopsy (see above).

Sampling skin/muscle (consent must be obtained for fetal skin)

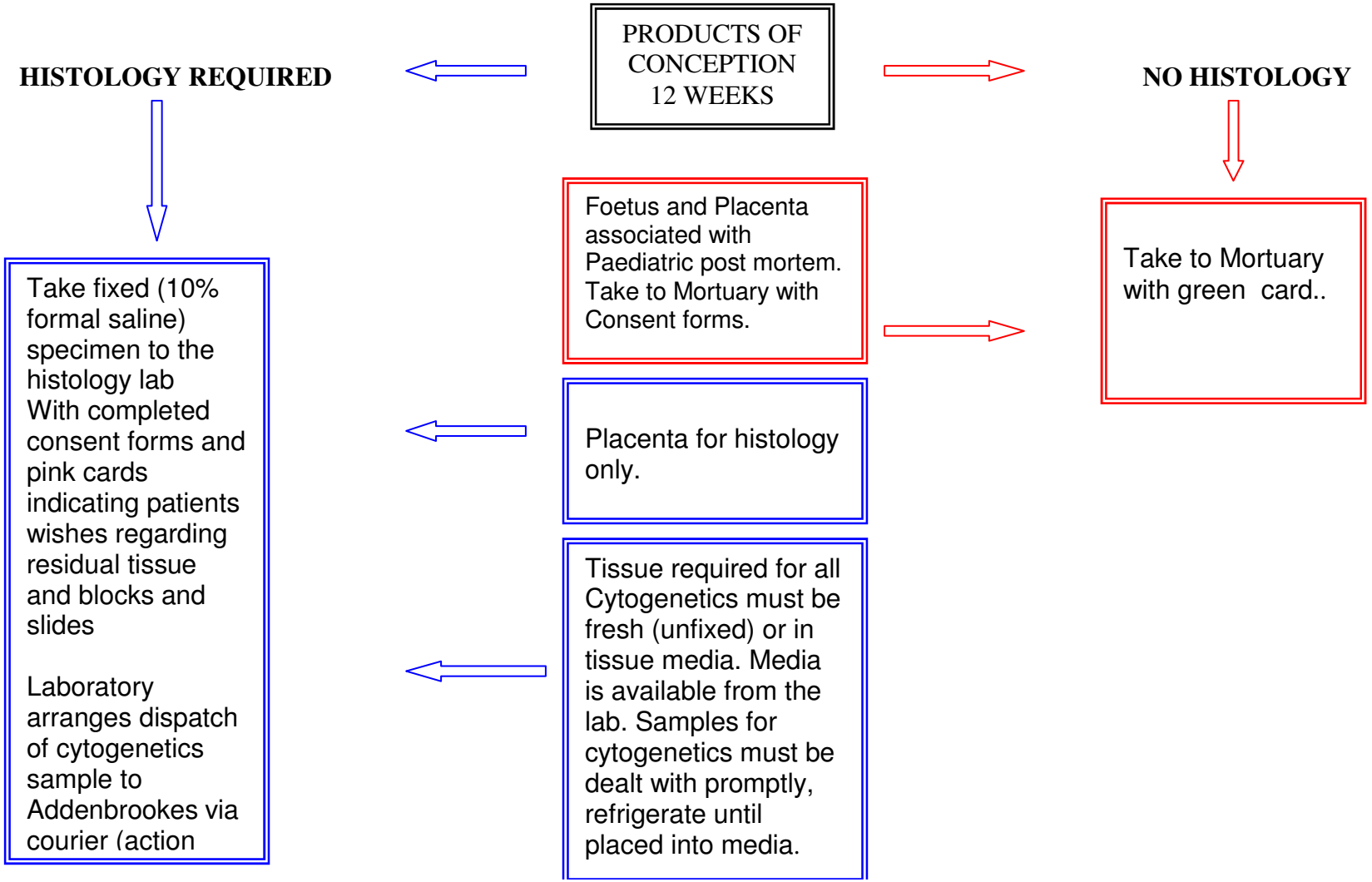
- Take the skin/muscle sample from the inside of the thigh, buttock or back of shoulder.
- Using sterile forceps and scissors, take a full depth skin biopsy ~ 1cm x 5mm if possible.
- Place the skin/muscle sample in a universal containing 5ml of tissue transport media (available from laboratory).

Accurately label the universal with the sample type, patient name, date of birth, hospital number and date of sampling.

If samples cannot be sent straight away, store in a refrigerator at 4°C (DO NOT freeze or place in formalin).

Samples should be accompanied by a Cytogenetics referral card.

QUICK REFERENCE GUIDE FOR THE PROCEDURE REGARDING PRODUCTS OF CONCEPTION.


PRODUCTS OF CONCEPTION 12 WEEKS
HISTOLOGY REQUIRED
NO HISTOLOGY
Take fixed (10% formal saline) specimen to the histology lab With completed consent forms and pink cards indicating patients wishes regarding residual tissue and blocks and slides
Laboratory arranges dispatch of cytogenetics sample to Addenbrookes via courier (action
Foetus and Placenta associated with Paediatric post mortem. Take to Mortuary with Consent forms.
Take to Mortuary with green card..
Placenta for histology only.
Tissue required for all Cytogenetics must be fresh (unfixed) or in tissue media. Media is available from the lab. Samples for cytogenetics must be dealt with promptly, refrigerate until placed into media.

Routine Histopathology Reports

. Copies of authorised reports are sent to the requesting Consultant or General Practitioner and are available through Apex system. Any enquiries about current cases should be made to the medical staff reporting the case through the histopathology office or histopathology laboratory on 3617. If there is an urgent case please let the laboratory know as soon as possible.

Out of hours clinical advice and requests

The department of Cellular Pathology **does not** operate a 24-hour service. If out of hour's advice is required contact the hospital switchboard to access a Consultant Histopathologist.

Cytopathology

There is no gynaecological / cervical screening service available at the Queen Elizabeth Hospital. The laboratory acts as a collection and transport provider for LBC samples. LBC samples from Norfolk are screened at the Cotman Centre, NNUH, Colney Lane, Norwich and Wisbech cases at Peterborough and Stanford Hospitals. All enquiries regarding these samples should be addressed to the referral centre.

For advice on tests not listed below please contact the laboratory on extension 3617.

Non Gynae Cytology

All specimens of sputum, aspirates and urine must be sent to the laboratory without delay. Specimens should not be sent after 16.00 hrs or at weekends. An appropriate request card containing the patient's name, date of birth, hospital number and/or NHS number and the reason for request must accompany all specimens. For all specimens taken outside of normal working hours, these must be stored at 4-8 degrees Celsius. Reports will be available after 2-3 working days. If a result is required urgently, please contact the laboratory as soon as possible on the next working day.

Services provided

Fine needle aspirates

If performing FNA at clinics please prepare the smear as blood film and provide at least I air-dried and I fixed slide labelled with the patients name/DOB and hospital number.

Exfoliative cytology

Bronchoscopy and other endoscopic samples

Please contact the laboratory if you require advice on specimen collection.

Sputum:

Collection technique: An early morning deep cough sample is desirable. The patient should rinse the mouth well with water to avoid contaminating the sample with food particles. Please send to the laboratory within one hour of production.

Urine:

Please send 50 mls (2 x 25ml universal containers). The optimum sample is the second sample of the day. The patient should collect the early portion of the stream. A mid stream urine is not suitable for cytology because it contains fewer cells.

Body fluids:

If enough material is available please send 2 x 25ml universal containers to the laboratory. This will allow us to prepare extra slides/cell block for conducting immunocytochemistry.

Autopsies/Mortuary

Written consent is required from the next of kin for hospital post-mortems. Contact Patient Affairs on Ext 3878. In cases where the cause of death is unclear the initial consultation should be with your consultant or other senior medical staff or with consultant Histopathologists. In cases of unexpected, perioperative, drug-related or traumatic death, or death of a patient with industrial disease, the Coroner´s office should be consulted. For further information and advice contact the Consultant Pathologist (Designated Individual Human Tissue Authority) or alternative Consultant Histopathologists.

Requests for Hospital Autopsies

The Clinician in charge should contact the Pathologist before the autopsy in order to discuss any points of interest and to state the mode of death to the best of their knowledge. The medical team who looked after the patient should discuss the possibility of the autopsy with the relatives. If permission is granted, the consent form should be completed, signed and witnessed. Use only Human Tissue Authority Consent forms available from the Bereaved Relative Support office or the Mortuary

Advice of Death Certificate and Coroners

Before the body is removed, it is the responsibility of the doctor concerned to examine the patient whose death is suspected and to establish that death has taken place. A registered or pre-registered medical practitioner may issue a Death Certificate when he/she knows the cause of death, knows it to be natural, has attended the patient within fourteen days of death and has no reason to refer the case to the Coroner.

Categories which should be reported to the Coroner:

1. Sudden and unexpected deaths in adults and infants
2. Deaths involving accidents, violence, neglect or poisoning
3. Deaths on the operating table or, before the patient has regained consciousness after anaesthesia

4. Death which might have been caused by an industrial injury or disease
5. H.M. prisoners or other detained persons under court order
6. Maternal deaths
7. Falls

The Coroners Officer can be contacted at King's Lynn Police Station.

Relatives Agreement

Hospital Post-mortem Examination

- Relatives' written agreement to the examination is required to be given on a standard form that the deceased had expressed no objection during life, or the relatives/next of kin.

- Relatives' consent to retain tissue samples or organs must be obtained on the form for agreement.

- The consent form and the accompanying information following the recommended style by the Human Tissue Authority are explicit and the form distinguishes between retention for the purposes of verifying the cause of death and investigation of the effects of treatment and retention for medical education and research.
- Relatives are also given the options for the lawful disposal of any retained tissue.

Paediatric and Perinatal Autopsies

These post-mortems are performed with the appropriate consent at Cambridge University NHS Trust. The appropriate consent forms must be received in the Mortuary to facilitate transport to Addenbrookes Hospital, Cambridge. For advice please telephone the Mortuary on extension 2561.

Viewing of deceased by Next of Kin

The relatives of the deceased should be informed that appointments are always necessary to view. Only in exceptional circumstances will viewings take place outside the working day. During the working day viewings are arranged between the hours of 13:00 and 16:00 Monday to Friday. Morning viewings may be possible upon consultation with the Mortuary staff. Contact the Mortuary on 2561 to arrange an appointment or Bereaved Relative Support. For viewings out of hours refer to the Mortuary out of hour's policy on the Trust intranet.

Ward Information

Information required from ward personnel.

Body must have legible IDENTITY BRACELETS on wrists.

- One completed 'Mortuary Card' taped on to the shroud (This stays on the body).
- One completed 'Mortuary Card' taped on to the top sheet (This is used to copy information for Bereaved Relative Support who informs GP's of their patients death.).
- Please fill in ALL details on card.
- Use the descriptive term yellow metal (YM) do not use the term "gold" to describe an item of jewellery.
- Use the descriptive term white metal (WM) do not use the term "silver" to describe an item of jewellery. Use the descriptive term "stones" not diamonds etc.

If possible please ensure that deceased body arrives in the mortuary in the following condition.

- Eyes closed
- Mouth closed
- Hair combed
- If the teeth cannot be placed back into mouth please send them down with the body.
- Leave any tubes and/or lines *in-situ* if the case is to be reported to the Coroner. If not, remove lines and/or tubes and tape over.
- If the deceased is in a body bag the reason why must be stated on the top Mortuary card.

Immune Sciences

Introduction

The Immune Sciences Department is part of Pathology at The Queen Elizabeth Hospital NHS Trust.

Department Location

The Immune Sciences Department is located on the ground floor of Pathology at the rear of the hospital. It can be sought from the reception area at the main entrance to the hospital.

Contact Numbers

General Enquiries		3771/3779
Results		3207
Karen Ashurst	Lead Scientist	3207

Normal Hours of Service

Normal working hours are Monday to Friday 08:00-18:00.

Urgent Requests Including Out of Hours

Few tests performed by the laboratory are required clinically on an urgent out-of-hours basis. Exceptionally, when circumstances justify a more rapid result, the request should be made personally to the relevant Senior technical Staff in the Department. Outside normal working hours contact is via the hospital switchboard to contact the on-call biochemist in the laboratory.

Contact information must be supplied when an urgent request is made.

Routine Requests

Most analytes and autoantibodies are carried out on the same day, or the day following receipt of the specimen. However as many tests are expensive when dealt with in small numbers and in order to maintain an economic cost and acceptable turn around time such assays are 'batched' according to the number of specimens received. If in doubt, please phone for advice. Assays that are batched include neoplastic, LKS immunofluorescence and cardiolipin antibodies.

Sample Requirements

Serum Samples

Most tests are performed on serum separated at room temperature. For serum, 10 ml blood should be collected in a yellow top tube with no anticoagulant. In most cases samples should be sent to the Pathology Reception area.

Storage of Specimens

Sera are stored at -20^{o}C and retained for at least three months before disposal. If further tests are required on a patient in the light of earlier results, it may be possible to save the inconvenience of a repeat venepuncture for the patient by contacting the laboratory and arranging further tests on the stored serum (subject to remaining serum).

Result Enquiries

Authorised results are available on the APEX system, which is updated regularly throughout the day. If a result is needed urgently and/or cannot be found via the APEX system the laboratory may be contacted on 01553 613207 during normal working hours.

Telephone Results

Results of urgent requests if APEX access or electronic delivery is not available and unexpected results which may aid the immediate patient management will be telephoned.

Turnaround Times

Turnaround times are quoted alongside each assay.

Assays

Disease associations, specimen requirements and turn around times are described below.
Reference ranges are quoted on all reports.

4.1 Adrenal cortex antibodies *(Serum: Negative)*

Adrenal autoantibodies are detected in about two-thirds of patients with idiopathic (autoimmune) Addison disease where there are other autoimmune diseases. Their prevelance falls when autoimmune adrenalitis occurs alone.
The adrenal cytochrome P450c21 enzyme 21-hydroxylase is the major target autoantigen in Addison disease and type I autoimmune polyglandular syndromes (APGS). Other antigenic enzymes in steroid-producing cells include the P450 side-chain cleavage enzyme (P450scc) associated with premature ovarian failure and 17α-hydroxylase (P450c17) associated with type I autoimmune polyendocrinopathy syndrome.
Autoimmune adrenal disease is closely associated with other organ-specific autoimmune disease:

Thyrogastric (Schmidt's syndrome)
Parathyroid autoimmune disease

The titre of antibody is of no significance; therefore a qualitative result is reported.

Turn around Time 14 days

Anti-Nuclear Antibodies

This indirect immunofluorescence (IIF) assay has been largely superseded by the EIA screening assay, however, may be performed by special request. Please contact laboratory.

Anti-Neutrophil cytoplasmic antibodies (ANCA)

Indicated in the investigation of vasculitis and performed by IIF. There are three main patterns – C-ANCA, PANCA and atypical ANCA. These patterns relate to different antigenic specificities e.g. proteinase 3 (PR3), myeloperoxidase (MPO) and others. All ANCA requests are tested for reactivity against PR3 and MPO.

Interpretations of ANCA staining patterns are shown below.

Antigen	Pattern	Disease Association
PR3	C-ANCA (90%) P-ANCA (2%)	Wegener's granulomatosus, microscopic polyarteritis, Churg-Stauss (30%)
MPO	P-ANCA	Systemic vasculitis eg Microscopic Polyangiitis, Churg Strauss, Crescentic glomerulonephritis
Various	Atypical ANCA	Wide range of inflammatory, infective & neoplastic diseases but the clinical utility of atypical ANCAs has not yet been established

NB - all types of ANCA have been reported in a wide range of other conditions e.g. infection, neoplasia and inflammatory disease as well as vasculitis. Serial monitoring of positive ANCAs may be valuable in the course of clinical disease. Patients with treated vasculitis can remain weakly ANCA positive for years in clinical remission.

Aspergillus fumigatus (IgG) precipitins

Associated with Allergic Broncho-Pulmonary Aspergillosis (ABPA), which usually presents as deteriorating or brittle asthma. IgE antibodies should also be checked.
This test is also useful in pulmonary aspergilloma (fungus ball), which may form in cavities or bronchiectatic lung, and hence may be of use in assessing aspergillus colonisation in Cystic Fibrosis and asthma. Aspergillus species can also cause invasive aspergillosis (IA). IA is the most difficult to diagnose, is most common in AIDS and lung transplant patients, is often fatal and occurs only occasionally in non-immunocompromised individuals.

Avian (IgG) precipitins

Positive levels indicate exposure to pigeon antigens and may be associated with Bird Fancier's Lung. The IgG-precipitating antibodies will react particularly with avian serum and faecal proteins. The presence of precipitins does not automatically mean that disease will be present as positive results may be seen in some healthy individuals exposed to birds. Any bird species is capable of inducing precipitins, but the most common causes are pigeons, psittacine cage birds and domestic poultry (occupational disease). High levels may be found in severe acute disease.

Beta-2 Glycoprotein-I antibodies (IgG/M)

Beta-2 glycoprotein-I antibodies are 50kD plasma proteins (apolipoprotein H) that inhibit the intrinsic coagulation pathway, ADP mediated platelet aggregation and the prothrombinase activity of activated platelets. "Anti cardiolipin abs" bind to an altered form of B2GP1 which may be reproduced by binding B2GP1 directly to an 'ELISA' plate. The detection of anti- B2GP1 abs is said to have enhanced specificity for APS and related coagulation disorders over the traditional anti-cardiolipin assay, which may display some false positive results due to cross reactivity of these abs with some infectious disease related antigens.

Brain antibodies

See Neoplastic antibodies.

Cardiac antibodies (Serum: Negative)

Though the diagnostic value is low these abs are found in some patients with Dresslers syndrome, following myocardial infarction, after cardiac surgery, in some cardiomyopathies and after acute rheumatic fever.

Centromere (kinetochore) antibodies (Serum: 0 – 10 U/ml)

Performed as a reflex from a positive ENA screen

Autoantibodies to centromeres (CENA) are found in 22% of patients with systemic sclerosis.

These antibodies are characteristic of the **CREST** (limited scleroderma) syndrome, a variant of systemic sclerosis with limited skin involvement but associated with **C**alcinosis, **R**aynaud's phenomenon o**E**sophageal immobility, **S**clerodactyly and **T**elangectasia. They are also found in up to 12% of patients with primary biliary cirrhosis that often overlaps with systemic sclerosis, whom about half will have clinical signs of scleroderma.

Patients with severe Raynaud's and other features of scleroderma, especially lung and other organ involvement, should also been screened for Scl-70 which is associated with diffuse systemic sclerosis. Positive CENA in patients with Raynaud syndrome suggest a transition to limited scleroderma.

Turn around time 2 working days

dsDNA binding antibodies (Serum: 0 – 10 U/ml)

A positive result for dsDNA antibodies supports the diagnosis of SLE.

dsDNA antibodies are not found in other connective tissue diseases, however only 60% of all patients with SLE have these antibodies in their serum and a negative test do not exclude the diagnosis. Occasionally DNA antibodies may be found in patients with 'lupoid' chronic active hepatitis. Weak positives are found in other connective tissue diseases and in chronic and acute infection.

A rising concentration may predict clinical relapse and treatment on a rising concentration before symptoms reappear may reduce the total amount of immunosuppression required.

Turn around time 2 working days

Endomysial IgA antibodies

This test has been superseded by Tissue Transglutaminase (tTG) antibodies.

4.11 ENA (Extractable nuclear binding) Antibodies

(Currently part of ANA screen)

ENA is a term used to describe antibodies to the soluble components of the nucleus. At the moment seven main antibodies are recognised (see below). Samples are firstly screened in an assay that detects all seven antibodies. If this screen is equivocal or positive, the antibodies are tested for individually (ENA Profile).

Specificities of Diagnostic Value Autoantibodies to:	Disease association (% positive)	Comment
RNP	MCTDs (>95%) SLE (40%)	Weak positive in Sjögren's syndrome & scleroderma
Ro	Sjögren's (70%) SLE (40%) Congenital heart block (60%)	
La	Sjögren's (50%) SLE (15%)	Usually in association with anti-Ro
Sm	SLE (30%)	Specific for SLE when present
Jo-1	Polymyositis (30%)	Associated with pulmonary fibrosis
Scl-70	Scleroderma (30%)	Specific marker associated with severe visceral impairment
Centromere	CREST syndrome (60-70%)	Limited cutaneous scleroderma

Turn around time 2 working days

Sm

Specific for SLE but found in only 20-30% of SLE patients with a higher incidence in non-Caucasians, especially those of Afro-Caribbean descent.

U_1RNP

A high titre positive result of only U_1RNP is diagnostic for MCTD but these antibodies are also found in 30-40% of SLE patients.

Ro or SS-A

The Ro (SS-A) antigen also occurs in the cell cytoplasm and very rarely a serum may be positive for Ro antibodies even in the absence of an ANA. These antibodies can cause congenital heart block and it is recommended that all female patients suspected of SLE or Sjögren's syndrome are screened for anti-SS-A (Ro) antibodies especially if they are considering pregnancy. These antibodies are associated with Sjögren's syndrome (up to 75% in primary Sjögren's), Sicca syndrome, and in many cases of Sjögren's syndrome secondary to a variety of other autoimmune diseases. They are also found in variants of SLE including subacute cutaneous lupus and neonatal lupus with congenital heart block and also in SLE resulting from homozygous C2 or C4 deficiency.

La or SS-B

Usually found with anti Ro in both primary and secondary Sjögren's syndrome and SLE. Sjögren's patients with anti-La are likely to have more extra-glandular disease.

Ro and La antibodies

These are often found together. La is a phosphoprotein and Ro a ribonucleoprotein and both can bind to the same molecule of a transfer RNA. SLE patients positive for Ro & La are likely to have lower DNA antibody titres and less renal disease.

Jo-l

(Antibodies to aminoacyl-tRNA histidyl synthetase). Associated with inflammatory muscle disease, especially idiopathic polymyositis.

Scl-7O

(Antibodies to Topoisomerase-I an enzyme catalysing the breaking and re-joining of ssDNA). Found in 20-40% of patients with systemic sclerosis, it is associated with facial skin, kidney and heart involvement, ischaemic fingertip ulcers and pulmonary fibrosis.

Epidermal antibodies

See Pemphigus and pemphigoid antibodies

Functional antibodies

These comprise abs to tetanus, pneumococci and Hib and are indicated as part of the investigation of suspected immune deficiency.

Specific antibody production is recommended for first line investigation of B-cell function in patients with recurrent infections, functional antibody responses can be abnormal even if immunoglobulin and Ig subclass levels are normal. T–cell dependent protein antigens (e.g. Tetanus and Diphtheria) produce an IgG1 response whilst polysaccharide antigens (e.g. Pneumovax and unconjugated *Haemophilus influenzae* vaccine) elicit an IgG2 response. Normal antibody production would include a rise in specific antibody levels within two weeks for protein antigens and within three weeks for polysaccharide antigens.

GAD antibodies

See Glutamic Acid Decarboxylase) ab's.

Ganglioside antibodies GM1

The presence of antibodies directed against GM1 (monosialoganglioside GM) has been associated with motor and sensorimotor neuropathies and in particular with multi- focal motor neuropathies (IgM). Lower titres of GM1 abs may also be found in amyotrophic lateral sclerosis

and Guillain-Barré syndrome (tends to be IgG). GM1 abs may occur as either polyclonal or IgM monoclonal abs. The carbohydrate moiety of GM1, in particular the galactose and sialic acid residues, is the site of antibody binding to gangliosides. Due to the presence of similar moieties on other gangliosides low levels of antibody cross-reaction may be experienced in tests for gangliosides other than GM1.
Other ganglioside tests are listed below
IgG anti-GQ1b
These antibodies are found in over 90% of patients with Miller-Fisher syndrome.
IgM anti-GQ1b
These antibodies are associated with a minority of patients with of chronic sensory neuropathy.

Gastric parietal cell antibodies

These antibodies are present in up to 90% of patients with atrophic gastritis and pernicious anaemia. They are also present in gastritis without anaemia (12%), autoimmune thyroid disease (30%), Addison's disease (25%) and iron deficiency anaemia (20%).
These antibodies have a strong association with pernicious anaemia and autoimmune gastritis (90% positive). Low titres are commonly found in normal elderly females. If positive the more specific assay for antibodies to intrinsic factor is performed. This is reported as part of the Tissue Autoantibody Screen request.

Turn around time 1 week

N.B. Clinical Biochemistry carries out assays for Vitamin B_{12}

Gliadin antibodies

This test has been superseded by Tissue Transglutaminase antibodies (see below).

Glomerular basement membrane antibodies.

These antibodies test for Goodpastures syndrome, which is a rapidly progressive glomerulonephritis. Antibodies to the non collagenous portion of type IV collagen are detected by EIA as indirect immunofluorescence is both less sensitive and less specific being positive in only 75%, or less, of proven cases. The antibody levels can also be of value in monitoring response to therapy of this disease.

Urgent requests for GBM abs (as with ANA, ANCA and dsDNA abs) must be arranged with the laboratory. If the laboratory is contacted arrangements can be made to carry out a test with results ready in 4 hours during the working day, if received by 13:00 hrs.

Turn around time 1 working day

Glutamic acid decarboxylase (GAD)

Glutamic acid decarboxylase (GAD) is an enzyme concentrated in neurons, which control muscle tone and exteroreceptive spinal reflexes. Antibodies to GAD are found in ~60% of patients with Stiff man syndrome and in IDDM where the titres are much lower. The contribution of GAD abs to IDDM has not been proved.

Histone antibodies

In cases of suspected drug induced SLE the antibodies are more likely to be directed against the histone moiety of the nucleoprotein complex than to the dsDNA.

IgG Subclasses

IgG subclass deficiency is mainly related to IgG1 and IgG2 where individuals suffer recurrent infections as they are unable to mount an antibody response against organisms.

IgE (total), Part of Allergy Test Screen.

Serum IgE may be helpful in the confirmation of atopic diseases however the normal range is very wide and levels do not correlate well with symptoms. A high level of specific IgE to a single allergen may be seen with a normal level IgE. Very high levels of IgE are seen both in atopic eczema and in parasitic infestations and also in the rare hyper-IgE syndrome.

Turn around time 2 weeks

Jo-l antibodies

See ENA antibodies

LKM antibodies

(Liver Kidney Microsomal) Part of Tissue Autoantibody Screen

These antibodies, which stain the cytoplasm of hepatocytes and *proximal* renal tubules, are found in a subgroup of patients with ANA negative, autoimmune chronic active hepatitis (CAH). LKM antibodies are positive in CAH type 2, which is the most common autoimmune liver disease of childhood

Turn around time 1 week

Mitochondrial antibodies

Part of Tissue Autoantibody Screen

Present in >95% of cases of primary biliary cirrhosis usually in high titre. Also occasionally present in chronic active hepatitis and halothane induced hepatitis patients but with weaker titres. Serum IgM levels are invariably polyclonally increased.

Turn around time 1 week

Mitochondrial (M2) antibodies

For those wishing to confirm the presence of mitochondrial abs or to monitor patients with a *quantitative* assay an EIA method is available which affords a quantitative assay of M2.

Turn around time 3 weeks

Myelin associated glycoprotein (MAG)

Myelin associated glycoprotein (MAG) is a glycoprotein component of the myelin of central and peripheral nervous systems present in the periaxonal region, Schmidt- Lantermans incisures, lateral loops and outer mesaxon of the myelin sheath. A member of the immunoglobulin super-family MAG probably functions as an adhesion molecule and mediates cell-cell interactions. Monoclonal reactivities against MAG are detected in about 50-75% of patients with IgM paraproteinaemia and peripheral neuropathy. Sera from patients with neuropathy that are negative for MAG antibodies often exhibit reactivity against various gangliosides.

Myeloperoxidase (MPO)

Also see Anti-Neutrophil cytoplasmic antibodies (ANCA)

Antibody to myeloperoxidase is associated with organ-limited vasculitis including necrotising and crescentic glomerulo- nephritis. The assay is useful in confirming MPO specific abs in sera, which are positive for anti neutrophil cytoplasmic abs of the perinuclear type (pANCA). Typically the level of MPO abs parallel disease state with increasing levels when vasculitis is active.

Urgent requests must be arranged with the laboratory.

Neutrophil cytoplasmic antibodies (ANCA)

This term encompasses antibodies to enzymes within the cytoplasmic granules of neutrophils. These are detected by indirect immunofluorescence (IIF) using human neutrophils. Antibodies directed against different enzymes are associated with different patterns of neutrophil cytoplasmic antibodies as detected by IIF. Please see below for clinical associations of ANCA.

Enzyme Linked Immunosorbent Assays (ELISA) assays are recommended for the complete characterisation of ANCA. i.e. antibodies to Proteinase 3 (PR-3), and Myeloperoxidase (MPO). These assays allow more accurate quantitation of the antibody than titration by IIF.

Diseases in which ANCA antibodies may be found:

Wegener's granulomatosis

Cytoplasmic ANCA (C-ANCA) is found in only about 85% of patients with active generalised Wegener's granulomatosis. Therefore the absence of these antibodies does not exclude the diagnosis. Antibody levels may fall with treatment. Patients with persisting elevations are more likely to relapse. Patients with limited Wegener's granulomatosis are less likely to be positive for ANCA either by IIF or ELISA. Up to 25% of patients with Wegener's granulomatosis may have a Perinuclear ANCA (P-ANCA) pattern on IIF and be positive for MPO antibodies by ELISA.

Microscopic polyangitis

pANCA, which is specific for MPO is seen in 50-80% of patients with active microscopic polyangiitis (which may affect only the kidney). The titre of antibodies reflects disease activity. Patients with persisting elevations are more likely to relapse. About 40% of patients with microscopic polyangiitis may be positive for PR3 antibodies.

Churg-Strauss syndrome

Some patients may be positive for either P-ANCA or C-ANCA.

Rapidly Progressive Glomerulonephritis.

Some patients may have C-ANCA or P-ANCA.

Drug-induced SLE or Vasculitis

High levels of MPO-ANCA are found in patients with some forms of drug-induced SLE or vasculitis. These levels drop after the drug is withdrawn.

Other diseases

Low titres of MPO-ANCA are occasionally found in RA, SLE, Chronic Hepatitis and Inflammatory Bowel Disease and Sclerosing Cholangitis. Such findings are of uncertain clinical significance. Low titre pANCA with specificities directed against antigens other than MPO also occurs commonly in the same group of diseases and again such findings are of uncertain clinical significance.
Atypical ANCA refers to a variety of observed immunofluoresence patterns and such antibodies are directed against a range of antigens including bacterial permeability increasing protein, azurocidin, lactoferrin, elastase, cathepsin G and lysozyme. The clinical significance of atypical ANCA is uncertain.

Ovarian antibodies

These antibodies are found in 15-50% of patients with premature ovarian failure under the age of 40 years. These antibodies react with steroid producing cells and thus also stain the steroid producing Leydig cells of the testis, the placenta and often also in the adrenal cortex. They are often seen in Autoimmune Polyglandular Syndrome-1 (APS-1) where adrenal and ovarian failure may co-exist. Up to 70% of women may have transient anti-ovarian antibodies during IVF therapy.

Turn around time 3 weeks

Pancreatic islet cell antibodies

At the time of diagnosis 75% of type I diabetics have detectable levels of circulating islet cell abs. Such antibodies decrease and eventually disappear with duration of disease. Some studies have indicated persistent levels of abs in association with polyendocrine disease (type Ib). There have been no reports of abs to pancreatic islet cells in type II diabetics.

Paraneoplastic neurological antibodies

Paraneoplastic neurological antibodies are associated with paraneoplastic neurological syndrome and systemic malignancies. Screening of neuronal and purkinje antibodies are performed by indirect immunofluorescence. If there is any staining present the specimen will be referred for further tests.
Further classification of paraneoplastic neurological antibodies will include the following:

Antibody	Neurological disorder(s)	Most frequent tumour(s)
Yo (PCA-1)	paraneoplastic cerebellar degeneration	Ovary, breast
Ma (Ma1)	paraneoplastic neurological disorder, brainstem encephalomyelitis	Various, lung cancer
Ta (Ma2)	brainstem encephalomyelitis, limbic encephalomyelitis	Testicular cancer
Hu (ANNA1)	paraneoplastic cerebellar degeneration, paraneoplastic encephalomyelitis, sensory neuropathy	small cell lung carcinoma
Ri (ANNA2)	opsoclonus/myclonus, paraneoplastic Cerebellar degeneration, brainstem Encephalomyelitis	Breast, small cell lung
GAD	Stiff person syndrome	Breast, colon, small cell lung carcinoma
CV2/CRMP5	paraneoplastic encephalomyelitis /sensory Neuropathy	small cell lung carcinoma, thymoma
Amphiphysin	Stiff person syndrome, paraneoplastic Encephalomyelitis	Breast cancer, small cell lung carcinoma
Tr	paraneoplastic cerebellar degeneration	Hodgkin's lymphoma

Turn around time 4-6 weeks

Pemphigus and Pemphigoid Antibodies

Abs are found in (i) intercellular substance of the epidermis (desmosome), which strongly suggest a diagnosis of pemphigus though these abs may also be found in patients with severe burns or a trichophyton infection (ii) dermal-epidermal basement membrane which is highly specific for bullous pemphigoid and is present in 80% of these patients.

Turn around time 2 weeks

Phospholipid antibodies

Phospholipid antibodies are a family of antibodies (Cardiolipin, b2-glycoprotein-1 and the Lupus Anti-Coagulant) useful in the investigation of the anti phospholipid syndrome. This may be primary or secondary to SLE. Patients with the 'anti-phospholipid syndrome' may be positive for **both** the lupus anti-coagulant and for the cardiolipin autoantibodies or for **only one** of these assays. Therefore samples should be sent for both tests.
Indications would include recurrent miscarriages and arterial and venous thrombosis. Slightly elevated levels may be found in some infections and so only positive results at two time points

at least 12 weeks apart are considered significant. IgG and IgM antibodies are assayed separately.

Please note that lupus anticoagulant is referred by Haematology.

The diagnosis of the anti phospholipid syndrome requires the appropriate clinical setting (detailed below) together with persistently (longer than 12 weeks) elevated anti phospholipid antibodies. The syndromes associated with anti-phospholipid antibodies are treatable and it is appropriate to seek its presence in the following groups of patients;

a) Women with recurrent unexplained foetal loss.
b) Young patients with stroke, myocardial infarction or transient ischaemic attacks - without other predisposing factors.
c) Young patients with recurrent venous or arterial thromboses.
d) Patients with unexplained thrombocytopenia.
e) Patients with chronic false positive VDRL.
f) Patients with SLE as part of assessment of thrombotic risk in pregnancy.

Please note that the cardiolipin antibody assay (particularly IgM) may sometimes give false positive results in patients with infectious diseases, i.e., syphilis, and in some individuals with anti-DNA antibodies.

Proteinase 3 (PR3) antibodies

PR3 antibody is a marker for Wegeners granulomatosis and is occasionally detected in microscopic polyarteritis. The value of PR3 antibody generally parallels disease activity with higher levels in the active state of the disease. EIA affords a quantitative assay, which is useful when monitoring the disease. Antibodies to PR3, an elastinolytic neural serine protease, are responsible for the characteristic granular cytoplasmic pattern of the neutrophils when stained by IIF.

Urgent requests must be arranged with the laboratory.

RAST tests (allergen specific IgE)

Assays for the detection of circulating IgE antibodies directed against specific antigens in sensitised patients are available for a range of allergens. Common assays include animal fur or dander, house dust mite, tree and grass pollens, moulds and a range of food substances including a variety of nuts. Tests against allergens in stock have a turnaround time of around 14 days.

N.B. Total IgE will be carried out on all RAST requests

Clinical details and **suspected allergens MUST be stated on the request**.

The use of RAST testing must be carefully considered and is not a substitute for careful clinical assessment. Many specific allergens are available for testing, however "screening " for allergy using RAST is not usually helpful
If requesting testing, please provide as much clinical information as possible.

The detection of allergen specific IgE in serum is not synonymous with clinical allergy, nor does the failure to detect allergen specific IgE exclude the diagnosis.

Turn around time 2 weeks

Scl-7O antibodies

See ENA

Skin antibodies
See Pemphigus and Pemphigoid antibodies

Sm antibodies
See ENA

Smooth muscle antibodies
Part of Tissue Autoantibody Screen
Present in high titre in up to 70% of patients with autoimmune hepatitis who may also be positive for mitochondrial, nuclear and dsDNA abs (25%). Low titre antibodies are found in a few patients with other liver diseases such as viral hepatitis or cholelithiasis.

Tissue Transglutaminase antibody
IgA Tissue Transglutaminase antibodies are present in at least 80% of patients with active coeliac disease. It will be absent in patients after 3-6 months on a gluten-free diet. Patients with Dermatitis Herpetiformis may also have positive coeliac serology.
All samples with a very low result will have total IgA measured to detect patients with selective IgA deficiency.
The endomysial autoantigen has been identified as the protein cross-linking enzyme tissue transglutaminase (tTG). Antigen specific EIA assays provide an alternative to the conventional indirect immunofluorescence assay based on primate oesophagus. The EIA assay provides a quantitative measurement of IgA anti-tTG antibodies and is not adversely influenced by the presence of other autoantibodies such as ANA or ASMA.

Turn around time 2 working days

U_1RNP antibodies
See ENA

Anti-Voltage Gated Potassium Channel abs (anti-VGKC)
Antibodies to voltage gated potassium channel are found in ~40% of patients with acquired neuromyotonia.

Anti-Voltage Gated Calcium Channel abs (anti-VGCC)
The Lambert Eaton myasthenic syndrome (LEMS) is a form of myasthenia often associated with small cell lung carcinoma. In ~50% of cases there is IgG mediated reduction in presynaptic voltage gated calcium channels.

Reference ranges

Autoantibodies:

REFERENCE RANGES				
Assay	**Negative**	**Equivocal**	**Positive**	**Units**
dsDNA	<10	10 – 15	>15	IU/ml
ENA Screen	<0.7	0.7 – 1.0	>1.0	Ratio
U1RNP	<5	5 – 10	>10	U/ml
Sm	<5	5 – 10	>10	U/ml
Ro	<7	7 – 10	>10	U/ml

La	<7	7 – 10	>10	U/ml
Centromere	<7	7 – 10	>10	U/ml
Scl-70	<7	7 – 10	>10	U/ml
Jo-1	<7	7 – 10	>10	U/ml
PR3	<7	7 – 10	>10	U/ml
MPO	<7	7 – 10	>10	U/ml
GBM	<7	7 – 10	>10	U/ml
CCP	<7	7 – 10	>10	U/ml
tTG (IgA)	<7	7 – 10	>10	U/ml
tTG (IgG)	<7	7 – 10	>10	U/ml

Allergy:

REFERENCE RANGES				
Assay	**Concentration**	**Rast Score**	**Level of allergen specific antibody**	**Units**
Specific IgE	<0.35	0	Absent/Undetectable	KUA/L
	0.35 – 0.69	1	Low	
	0.70 – 3.49	2	Moderate	
	3.50 – 17.49	3	High	
	17.50 – 52.49	4	Very High	
	52.5 – 99.99	5	Very High	
	≥100	6	Very High	
Total IgE	-	-	-	KU/L

Reference Laboratories

Detailed in the table below are the reference laboratories for immunology assays not performed in the department

REFERENCE LABORATORIES				
Laboratory	**Location**	**Address**	**Contacts & Phone Numbers**	**CPA Status**
John Radcliffe Hospital	Oxford	Dr A Vincent, Neurosciences Group, Institute of Molecular Medicine, John Radcliffe Hospital, OXFORD, OX3 9DU	Dr Angela Vincent	Unconditional
Immunology Department and Protein Reference Unit	Sheffield	Kevin Green P.O Box 894 Sheffield S5 7YT	Kevin Green 0114 271 5707	Accredited
Birmingham, Clinical	Birmingham	University of Birmingham	Abid R Karim	Accredited

Immunology Service		Division of Immunology and Infection Vincent Drive, Edgbaston Birmingham B15 2TT	0121 415 8797 Results on 0121 414 3824	
Biochemistry & Immunology	Norwich	Norfolk and Norwich University Hospital Colney Lane Norwich NR4 7UY	Dr Ian Thirkettle 01603 286922	Accredited

Appendix 1: Test container guide

Current version April2013

	Dark green - lithium/heparin without gel	⊘	Refer to consultant
	Light green – lithium/heparin with gel	RT	Room Temperature
	Lavender EDTA	C	Chemistry
	Gold clotted with gel	H	Haematology
	Red Clotted	XM	Transfusion
	Grey – Sodium oxalate	S	Serology
	Light blue - citrate	IS	Immunosciences
			Referred out

Specimen	Discipline	Code	Container	Specific Details / Instructions
βHCG	C	QHCG	**SST**	
17 Hydroxyprogesterone	C	17OHP	**SST**	⊘ Sent to Leeds
5H1AA (urine)	C	U5H1AA (U5H1AQ)	**24hr urine** (+10mLs Conc HCl) 10mL universal container	In house analysis. Positive results referred.
6TGN/6MMP	C	TGN	**6ml EDTA**	⊘ Sent to Leeds
ABMA	IS	GBM	**SST**	
Acanthocytes	H	FBC + FI	**3ml EDTA**	Less than 4 hours old, request blood film
Acetylcholine Receptor Antibody	C	ACRA	**SST**	Sent 1st class to Oxford
ACR	C	ACR	Urine Universal	Random Sample also known as Albumin Creatinine Ratio
ACRA	C	ACRA	**SST**	See Acetylcholine Receptor Antibodies
Acylarnitine	C		Heel Prick	Sent directly by clinician to Addenbrookes.

ADB	S		SST	
Adenovirus	S	NADEN	**SST**	Included in Atypical Pneumonia Complement Fixation tests (CFT)
ADH	C		Lithium heparin	**ON ICE**
Adrenal Stimulation test	C		**SST**	Blood and/or urine cortisol
Adrenal Suppression test	C	ACFT1	**SST**	Dynamic function test of cortisol – baseline and timed samples required
Adrenocorticotrophic Hormone (ACTH)	C	ACTH	**6ml EDTA**	On Ice. To be frozen. Sent by courier to N&N
Albumin Creatinine ratio	C	ACR	Urine universal	Random Sample also known as ACR
Alcohol levels	C	ETOHALB	**Grey**	⊘
Aldosterone/Renin Activity	C	RAPROF	**6ml Lithium Heparin @ RT**	Rest for 30 mins pre venepuncture. On Ice Freeze. Sent to St Marys by courier
Alkaline Phosphate	C	ALK	**SST**	
Alkaline Phosphatase Isoenzyme	IS	ALKISO	**SST**	Also order ALK, GGT and B
Alloantibody Identification	XM	SPI	**6ml EDTA x 2**	Sent to Collindale
Alpha 1 Antichymotrypsin	IS		**SST**	
Alpha 1 Antitryspin	IS	A1AT	**SST**	
Alpha 1 Antitryspin Phenotype	IS	A1ATP	**SST**	Sent to Hallamshire by 1st class
Alpha Feto Protein	C	AFP	**SST**	
Alpha Thalassemia screen	H	HBOP	**3ml EDTA**	Request form to Haem
Aluminium	C	ALU	**2 x Clotted Labelled as 1 & 2**	First sample discarded. Do Not Separate. ⊘

				Sent to trace elements in Guilford. See SOP.
Amikacin Levels	S		SST	
Amino Acids	C	SAMINO	SST or **Plasma**	Sent 1st class to Addenbrookes
Aminolaevulinate	C	AMINOL	**24hr urine**	
Aminophylline	C	THEO	SST	
Amiodarone	C	AMIO	**Clotted. Keep in dark**	Centrifuge, Separate, Keep in dark ⃠ Sent to Liandough Hospital by 1st class
Ammonia	C	AM	**Lithium Heparin**	On Ice Inform Lab. Analyse within 30 mins of venepuncture
Amylase	C	AMY	SST	
Amylase ISO Enzyme, Macro	C	AMYISO	SST	Sent to Great Ormand St by 1st class
Amyloid A protein	C	AMAPR	SST	Sent to Royal Free Hospital by 1st class
Anaphylactic Reaction	C	TRYPT	SST	Protocol available. See tryptase
ANCA	IS	ANCA	SST	
Androgen Profile	C		SST	
Androstenedione	C	ANDRO	SST	Sent to Leeds by 1st class
Angiotensin Converting Enzyme	C	ACE	SST	
Antenatal Booking Screening	XM	PSG or PG & G	**6ml EDTA,** 3ml EDTA, SST X 2 + Sodium Fluoride	SST X 2 1 for Serology 1 for ferritin if req'd
Anti Adrenal Antibodies	IS	CAD	SST	Sent 1st class to Sheffield
Anti B2 Glycoprotein Abs	IS	B2GG	SST	

Anti basement Membrane Antibody	IS	GBM		
Anti Cardiac Abs	IS	CAB	SST	Sent 1st class to Sheffield
Anticardiolipin	IS	CARD	SST	
Anti D/c Quantification	XM	SPI	6ml EDTA	Sent to Collindale
Antidiuretic/vasopressin	C		Lith/Hep	See ADH
Anti D Titre	XM		6ml EDTA	
Anti endomycial	IS	TTG	SST	
Anti GAD	IS	GAD	SST	Sent 1st class to Sheffield
Anti GBM	IS	GBM	SST	Also known as Glomerular Basement Membrane
Anti Gliadin Abs	IS	TTG	SST	See TTG
Anti Glutamic Acid Dicarboxylase	IS	GAD	SST	Sent 1st class to Sheffield
Anti GM1 (ganglioside GM1 antibodies)	IS	GANG	SST	Sent 1st class to Sheffield
Anti Histone Abs	IS	HIST	SST	Sent 1st class to Sheffield
Anti Islet Abs	IS	ICAB	SST	Sent 1st class to Sheffield
Anti LKM Abs	IS	LIV	SST	
Anti MAG (Myelin associated glycoprotein)	C	MYAG	SST	Sent 1st class to Sheffield
Anti Mitochondrial Antibodies	IS	LIV	SST	
Anti Neuronal Abs	IS	NP	SST	
Anti Nuclear Antibodies (Ro,La,Sm,RNP, So,Sel)	IS	ANF	SST	
Anti Neutrophil Cytoplasmic Antibody	IS	ANCA	SST	Abs to MPO & PR3
Anti Perkinje Abs	IS	NP	SST	
Anti Phospholipid (Part of Lupus)	IS	CARD	SST	Cardiolipin profile – normally with lupus

Anti PR3/MPO	IS	ANCA	SST	
Anti Skeletal (striated) Muscle Abs	IS		SST	Sent 1st class to Sheffield
Anti Sperm Antibodies	S		SST	
Anti Staph	S		SST	
Anti Strep abs	S		SST	
Antistrepolysin O	S	ASO	SST	
Anti Thrombin	H	ATH	Citrate	Part of TPSA. Only to be taken Mon-Thurs 9am-2pm. To be sent same day. Sent 1st class to Addenbrookes
Anti thrombin III	H	ATH	Citrate	Part of TPSA. Only to be taken Mon-Thurs 9am-2pm. To be sent same day. Sent 1st class to Addenbrookes
Anti thyrotrophin Receptor Abs	C	TRAB	SST	Cardiff
Anti topoisomerase-I (scl70) abs	IS	ANF	SST	
Anti TSH receptor Antibodies	C	TSHRAB	SST	
Anti V Gated Calcium/Potassium (Ca/K) 2T Chan EL	IS	VGC/VGK	SST	Sent to Oxford 1st class
Anti Xa	H	HEPL	Citrate	Must give name of heparin used.
Apolipoprotein	C	APO	SST	Full lipid profile.
APTT	H	APTT	Citrate & 3ml EDTA if not requested	
Aquaporin 4 abs	IS	AQUA4	SST	Only neurologists. Sent 1st class to oxford

Arlysulphatase-A	C		**Lith/Hep**	Unseparated, unfrozen – see white cell enzyme
Aspergillus ppts	IS	ASPERP	**SST**	Sent 1st class to Sheffield
Atenolol Levels	C	ATE	**Clotted**	Spin, separate. Sent to Liandough Hospital by 1st class
Atypical Mycobacteria	S		**Lith/Hep**	
Atypical Pneumonia Complement Fixation Tests (CFT)	S		**SST**	
Auto Antibodies – liver	IS	LIV	**SST**	
Auto immune profile	IS	ANF	**SST**	
Autoimmune Haemolytic Anaemia Investigation	XM	SPI	**Clotted** **2 x 6ml EDTA**	Must be in time to go to NMS same day
Autoimmune Thrombocytopenia PAIg	XM	SPI	Refer to transfusion for request form	Must be in time to go to NBS same day
Avian Precipitins	S	AVP	**SST**	
B12 Folate	C	BSF	**SST & 3ml EDTA**	
B12 Vitamin	C	B12	**SST**	
B2 Microglobulin	C	B2M	**SST**	
Bartonella	S		**SST**	
Beta 2 transferrin tan protein	IS	TAUP	**Nasal/Ear Secretions**	Sent 1st class to St George's
Beta Carotene	C		**SST**	Freeze, protect from light
Beta Hydroxybutyrate			**Urine Dipstick**	Ketone, DKA suspicion
BFT	C	B	**SST**	Uncuffed sample
BHCG	C	HCG	**SST**	
Bicarbonate/HC03	C	BIC	**SST**	
Bile Acids	C	BIAC	**SST**	
Bilirubin (total/split/conjugated/unconjugated)	C	TBIL/BILS	**SST**	
Biotinidase	C	BIOT	**Lithium Heparin**	Centrifuge, separate

				and freeze. Sent to Addenbrookes by 1st class
Bleeding time	H	BT		By appointment
Blood Film	H	FI	3ml EDTA	Less than 4hrs old
Blood group	XM		6ml EDTA	
Blood Metal	C			See cobalt and chromium
BNP	C	BNP	3ml EDTA	Specialised Form
Bone Profile (TP,ALB,Ca, ALK, GLOB)	C	B	SST	Uncuffed as Ca
Borrelia Burgdorferi (Lyme disease)	S	LYM	SST	6/52 post onset
Brain Natriuretic Peptide	C	BNP	3ml EDTA	Specialised Form
Bromide	C		SST	
Brucella	S		SST	
C1 Esterase Inhibitor	C	C1IN	SST	Sent to Hallamshire by 1st class
C3/C4	C	COMP	SST	See Complement levels
CA125 (Ovarian Tumour Marker)	C	CA125	SST	
CA153 (Breast Tumour Marker)	C	CA153	SST	Sent to N&N by 1st class
CA19/9 (Pancreatic Tumour Marker)	C	CA19/9	SST	
Cadmium	C		**Urine universal +**3ml EDTA	
Caeruloplasmin + Copper	C	CAERUQ & CUQ	SST	Sent to trace elements Guilford by 1st class
Calcitonin	C	CALCIT	6ml EDTA	On ice/freeze Sent to Charing Cross by courier
Calcium	C	CAL	SST	Uncuffed
Carbamazapine	C	CARB	SST	

Carbohydrate deficient transferring (CDT)	IS		SST	
Carbon Monoxide levels	C	COHB	Lithium Heparin	See CarboxyHaemoglobin
Carboxyhaemoglobin	C	COHB	Lithium Heparin	Do not separate
Carcino Embryonic Antigen	C	CEA	SST	
Cardiac	C	C/CK	SST	
Cardiolipin Antibodies	IS	CARD	SST	Sent 1st class to Addenbrookes
Catecholamines (urine)	C	24UCAT	24hr urine	20 ml aliquot. Record volume ensure pH <3.0
CD4 / CD8 SUBSETS	H	SUBS	3ml EDTA	Copy of FBC results Usually high risk Do not refrigerate
CDT	IS		SST	See Carbohydrate deficient transferring
CEA	C	CEA	SST	See Carcino Embryonic Antigen
Chlamydia – genital	S	CHY	Swab	
Chlamydia (respiratory psittacosis)	S	NCHY	SST	
Chloride	C	CL	SST	
Cholesterol/Total cholesterol/HDL	C	CHOL/ TCHOL	SST	
Cholinesterase	C	PCHOL	SST	
Cholinesterase for Suxamethonium Sensitivity	C	SUXTYP	SST	Sent to South Mead Hospital by 1st class
Chromogranin A	IS		SST	Sent 1st class to Sheffield
Chromosomes	C	CHROMA (Adult)	10ml Lithium Heparin	Before noon, not on Friday. If DNA fragile X required 3mL EDTA.Do not spin/separate. Sent to Addenbrookes by 1st Class
Chromosomes PAED	C	CHROMC (Child)	Dark green 5ml	
Citrate (Urine)	C	UCIT	EMU	

CK	C	CK	SST	
CK Isoenzymes	C	CKISO	SST	Sent to Royal Free Hospital by 1st class
Clonazepam	C	NCDS	SST	⊘
Clozapine	H	FBC	3ml EDTA	See clozeril
Clozeril	H	FBC	3ml EDTA	
CMV	S		SST	
CMV Viral load	S		**6ml EDTA**	
Coagulation Screen	H	COA	**Citrate + 3ml EDTA if not requested**	Less than 4hrs old
Cobalt /Chromium	C	COBAL/CR	**2x 5ml EDTA labelled 1 & 2**	Centrifuge, separate, freeze. Sent to trace elements Guilford by 1st class
Coeliac disease	IS	TTG	SST	
Cold Agglutinins	XM	CAT	**5ml EDTA + Clotted**	Keep at 37°C
Complement (C3 + C4)	C	COMP	SST	
Complement Fixation Test	IS		SST	
Conjugated/unconjugated bilirubin	C		SST	
Coombs test	XM		**5ml EDTA + Clotted**	
Copper	C	CUQ	SST	Sent to trace elements Guilford by 1st class
Coronavirus DNA	S		**Swab VTM**	
Cortisol	C	CORT	SST	
Coxiella burnetti (phase1 & 2)	S		SST	
Coxsackie/Enterovirus	S	ENT	SST	Samples taken when date of onset = <2weeks – will be stored
C-Peptide	C	C-PEP	SST	Freeze. Sent to Guilford by 1st class
C-Reactive Protein	C	CRP	SST	

Creatinine	C	CRE	SST	
Creatinine Clearance	C	CRECL	SST + 24 hr urine	SST to be taken within 3 days of urine collection
Creatine Kinase	C	CK	SST	Also known as CK
Crossmatch	XM	C	5ml EDTA	**4 POINTS OF ID REQUIRED** SEND EXTRA SAMPLE IF PATIENT HAS KNOWN ANTIBODIES
Cryoglobulin	C	CRYO	Taken into 37°C SST	37°C for 1 hr. Transfer to fridge once separated
Cryptococcus antigen	S		SST	
CSF Studies (oligoclonal banding)	C	CSFP	CSF + Serum (concurrent)	
Cyclosporin Adult	C	CYCLOA	3ml EDTA	Pre-dose. Do not separate. Sent to Addenbrookes by 1st class
Cyclosporin PAED	C	CYCLOA	3ml EDTA	Pre-dose. Do not separate. Sent to Addenbrookes by 1st class
Cystine/Homocystine	C	SAMINO		Phone Lab pre venepuncture. Sent to addenbrookes by 1st class
Cytogenetics (Chromosomes)	H	CYTOA	Bone marrow or Lithium Heparin	Do not spin/separate. Sent to Addenbrookes by 1st class
Cytomegalovirus Antibodies	S	CMV	SST	
Cytomegalovirus DNA	S		6ml EDTA	
Cytomegalovirus States	S		SST	

D-Dimer	H	DIMS	Citrate	Less than 4hrs old. Requires wells score or probability score.
DAGT	XM	DAGT		See Coombs Test
Dehydroepindrosterone Sulphate	C	DHEAS	SST	Sent to Leeds by 1st class
Dengue Fever	S		SST	
Dexamethasone Suppression test	C	CORT		See Cortisol
DHEAS	C	DHEAS	SST	Sent to Leeds by 1st class
Diagnostic Coag Screen	H	HC	Citrate + 3ml EDTA	Less than 4hrs old
Dibucaine	C	SUXTYP	SST	See SUXTYP
Digoxin	C	DIG	SST	
Dilute Russell's V/Venom Time (DRVVT)	H	LUPUS	3 x Citrate	Sent to Addenbrookes by 1st class on same day. Only bleed mon-thurs 9am-2pm
Direct Antihuman Globulin (Coombs) Test + Fractions	XM	DAHT	6ml EDTA	
Direct Antihuman globulin test (DCT)	XM	DCT	6ml EDTA	
Direct Early Antigen Fluorescent Foci	S	DEAFF	6ml EDTA	Contact Serology
Direct Granulocyte	XM		20mL EDTA + 10ml SST	Straight to Lab
DNA Antibodies ds	IS	DSDNA	SST	
DNA Studies (Fragile X)	C	DNA	5-10ml EDTA	See Fragile X
DsDNA	IS	ANF	SST	
EBV	S		SST	
EBV DNA	S		6ml EDTA	
EDTA Clearance	C	CEDTA	Lithium Heparin	3 Samples at timed intervals -
EGFR	C	E	SST	
Electrolytes	C	E	SST	
Electrophoresis	C	EP	SST	

ENA Antibodies	IS	ENA	**SST**	
Endomysial Anti see TTg	IS	TTG	**SST**	
Enterovirus	S	ENT	**SST**	
Enterovirus RNA	S		**CSF Sample**	
EP	C	EP	**SST**	
Epanutin Levels	C	VALP	**SST**	See Valproate
Epilim	C	VALP	**SST**	
EPO	H	EPO	**Clotted**	See erythropoietin – send copy of FBC results. Sent 1st class to Kings college London
Epstein Barr Virus (Glandular Fever)	S	EBV/IM	**SST**	
Epstein Barr Virus DNA	S		**6ml EDTA**	
Erythropoietin	H	EPO	**Clotted**	Send copy of FBC results. Sent 1st class to Kings college London
ESR	H	ESR	**Black cap**	Mix well
Ethosuximide (anticonvulsant)	C	ETHOS	**Clotted**	Sent to Liandough Hospital by 1st class
Extended RBC Phenotyping	XM	PGS or PG & G	**6ml EDTA**	
F13 Deficiency	H	F13R	**2 x Citrate**	Sent to Addenbrookes
Factor II	H	FIIR	**2 x Citrate**	Sent to Addenbrookes
Factor IX	H	F9	**2 x Citrate**	
Factor V	H	F5R	**2 x Citrate**	Sent to Addenbrookes
Factor V Leiden	H	FVL	**3ml EDTA**	Request needs to be on a molecular genetics form
Factor VII	H	FVIIR	**2 x Citrate**	Sent to Addenbrookes

Factor VIII	H	F8	**3 x Citrate**	
Factor VIII Inhibitor	H	F8I	**2 x Citrate**	
Factor VIIIc Assay	H	F8R	**2 x Citrate**	Sent to Addenbrookes
Factor X	H	HEPL	**Citrate**	
Factor XI	H	F11	**2 x Citrate**	
Factor XII	H	F12R	**2 x Citrate**	Sent to Addenbrookes
Farmers Lung	S	FL	**SST**	
FBC	H	FBC	**3ml EDTA**	
Feacal Alpha 1 Antitrypsin	C	FA1AT	Faeces	Frozen. Sent to St George's by courier
Feacal Elastase	C	ELAS	Faeces	Random. Sent to Addenbrookes by 1st class
Ferritin	C	FER	**SST**	
Fibrinogen	H	FIBC	**Citrate**	
Fibrinogen Degradation Products (FDP'S)	H	FDP	**Citrate**	
FISH (Cytogenetics)	C	FISH	**10ml Lithium Heparin**	Sent to Addenbrookes by 1st class
FK506	C	FK506	**3ml EDTA**	Sent to Addenbrookes or Kings college by 1st class. See SOP
Flecainide	C	FLEC	**SST**	⊘
Flucytosine	S		**SST**	
Folate	C	SF	**SST** + **3ml EDTA** **for FBC**	If required – RCF
Follicle Stimulating Hormone	C	FSH	**SST**	

Fragile X	C		**10mL EDTA + 10ml Lithium Heparin**	Requested with Chromosomes, not on Fridays. Sent to Addenbrookes 1st class
Free T3	C	FT3	SST	Only Dr George/Jennings
Free T4	C	FT4	SST	Only Dr George/Jennings except Paeds
Free/Total PSA Ratio	C	RPSA	SST	⃠ Sent to Addenbrookes by interlink (9.30am)
FSH	C	FSH	SST	Also known as Follicle Stimulating Hormone
FT3/ FT4	C	FT3/FT4	SST	Also known as Free T3 and Free T4. Dr George/Jennings only except Paeds
Full Blood Count (FBC)	H	FBC	3ml EDTA	
Functional Antibodies	IS	FUNCAB	SST	Sent 1st class to Sheffield
G6PD	H	G6PD	3ml EDTA	See Glucose-6-phosphate dehydrogenase deficiency
GMMP	C	TPMT		See TPMT
Galactomannan Antigen Test	C	GAL	SST	⃠
Galactosidase *See WCE*	C	WCE	**6ml EDTA**	
Gamma Glutamyl Transferase (γGT)	C	GGT	SST	
Gastric Parietal Antibodies	S	APCA	SST	
Gastrin	C	GAST	6ml EDTA	On ice. Frozen. Sent to Charing Cross by courier
GBM	IS	GBM	SST	Also known as Glomular Basement Membrane

Genetic Test	H	DNA	**2 x 6ml EDTA**	Sent to Addenbrookes by 1st class
Genetics (DNA)	C		**10mL EDTA**	Sent to Addenbrookes by 1st class
Gentamicin Level	C	GEN & TIME	**SST**	State time sample taken and time of last dose
GGT	C	GGT	**SST**	Also known as Gamma Glutamyl Transferase
Glandular fever Test (GFT) monospot	H	GFT	**3ml EDTA**	
Glomular Basement Membrane Abs (GBM)	IS	GBM	**SST**	
Glucagon	C	GAST	**6ml EDTA**	See Gastrin
Glucagon Stimulation Test	C		**SST**	Cortisol and GH measurements
Glucose	C	GLUC	**Sodium fluoride**	
Glucose Suppression Test	C		**SST**	GH testing
Glucose Tolerance Test	C	Different codes for Different Locations	**Sodium fluoride**	Sample 1 at fasting. Sample 2 two hours after glucose loading drink
Glucose-6-phosphate dehydrogenase deficiency screen	H	G6PD	3ml EDTA	If screen shows a deficiency send EDTA to Addenbrookes for G6PD assay with aged matched sample.
Gonadotrophins	C	INF	**SST**	Refer to FSH/LH
Granulocyte Immunology	XM	SPI	See XM (IBGRL Bristol)	0117-991 2108

Group & Antibody Screen	XM	PG & G OR PGS	**6ml EDTA**	
Growth Hormone	C	GH	**SST**	
Gut Hormones	C	GUT	**6ml EDTA**	On ice Centrifuge, freeze. Sent to Charing Cross by courier
Haematinics	C	BSF+ FER	**SST**	
Haemochromatosis	H	HFE	**3ml EDTA**	Sent to N&N by 1st class
Haemoglobin H	H	HBH	**3ml EDTA**	Stat test by prior arrangement
Haemoglobin Solubility test	H	HBS	**3ml EDTA**	Also book in with HBOP
Haemoglobinopathy screen	H	HBOP	**3ml EDTA**	Form to go to Haem desk
Haemoglobinopathy Referral	H	HBOPH	**3ml EDTA**	Sent to Central Middlesex by 1st class
Haemolytic Transfusion Reaction	XM	PGS & DAGT	**6ml EDTA** + cultures + 3ml **EDTA** (FBC)	Refer to Trust Transfusion Policy. Complete Transfusion reaction form.
Haemosiderin	H	UHAEM	**Urine**	
Hairy Cell Leukaemia			**SST**	
Haptoglobins	C	HAPT	**SST**	
HBA1C	C	GLYHB	**EDTA** or **Sodium Fluoride**	Ensure separate sample to FBC
HCG (BLOOD)	C	HCG	**SST**	
HCG (URINE)	H	HCG	**Urine Universal**	
HCO3	C	BIC	**SST**	Also known as Bicarbonate
HDL	C	TCHOL	**SST**	Part of lipid/cholesterol profile

Heinz Bodies	H	HBO	3ml EDTA	Straight to Haem
Heparin	H	HEP	**Citrate & 3ml EDTA if not already requested**	
Heparin (Low Molecular Weight) anti Xa	H	HEPL	**Citrate**	Must name Heparin used
Heparin (unfractionated i.m) anti Xa	H	HEPU	**Citrate**	Must name Heparin used
Heparin Induced Thrombocytopenia HIT	XM	SPI	Refer to Transfusion for request form	Must be in time to go to NBS same day
Hepatitis A IgG	S		**SST**	
Hep B DNA	S		**6ml EDTA**	
Hep B DNA Viral Load	S		**6ml EDTA**	
Hep B Genotype	S		**6ml EDTA**	
Hepatitis B Surface Ag	S	HEPB	**SST**	If genotype, RNA DNA or PCR mentioned then **6ml EDTA** also required
Hep C DNA Viral Load	S		**6ml EDTA**	
Hep C Genotype	S		**6ml EDTA**	
Hep C RNA	S		**6ml EDTA**	
Hepatitis C Virus	S	HCV	**SST**	Consent required. If genotype, RNA DNA or PCR mentioned then **6ml EDTA** also required
Hepatitis D abs	S		**SST**	
Hepatitis E IgG/IgM	S		**SST**	
Herpes Simplex	S	HSV	**SST**	
Herpes Simplex Virus DNA	S		**CSF Sample / 6ml EDTA**	
HFE	H	HFE	3ml EDTA	Sent to N&N by 1st class
High Density Cholesterol (HDL)	C	TCHOL	**SST**	Part of lipid/cholesterol profile

Histocompatibility & Immunogenetics	XM	SPI	Refer to Transfusion for request form	Must be in time to go to NBS same day
Histone Antibodies	IS	HIST	SST	Sent to Sheffield by 1st class
Histoplasma	S		SST	
HIV	S		SST	Consent to testing required.
HIV Maternal transmission	S		6ml EDTA	
HIV proviral DNA PCR	S		6ml EDTA	
HIV resistance testing	S		6ml EDTA	
HIV Viral Load	S		6ml EDTA	
HLA Antibodies (Anti-paternal)	XM	SPI	Refer to Transfusion for request form	Must be in time to go to NBS same day
HLA B27	H	B27	3ml EDTA	Mon – Thurs. Sent to N&N in tins.
HLA Class I & II typing of Patients & Family Members	XM	SPI	Refer to Transfusion for request form	Must be in time to go to NBS same day
HLA Class I typing for HLA Matched Platelets	XM	SPI	Refer to Transfusion for request form	Must be in time to go to NBS same day
HLA-H (HFE) for hereditary Haemochromatosis	H	HFE	3ml EDTA	See HFE
Homocystine	C	SAMINO		Ring Lab pre venepuncture. See Cystine.
Homogentisate			**Urine Universal**	Random Sample
HTLV	S		SST	
Human T-Lymphotrophic virus	S		SST	
Hydroxyindole acetic acid urine	C	UH5IAA	24hr Urine	See Catecholomines
Hydroxyproline	C	UOHPRO	24hr Urine	
Hydroxytryptamine			24hr Urine	

IgA Deficiency / Anti-IgA Antibodies	XM	SPI	**6ml EDTA**	
IgG Subclasses	C	IGG4	**SST**	Sent 1st class to Sheffield
Immune Neutropenias (auto,all,drug induced)	XM	SPI	Refer to Transfusion for request form	Discuss with IBGRL in Bristol
Immunoglobins	C	IGS/EP	**SST**	Also known as protein electrophoresis
Immunoglobulin E	C	IGE	**SST**	
Immunoreactive Trypsin	C	IRT	**SST**	
Immunophenotyping	H	IMM	**10-20ml EDTA**	Post to Addenbrookes by 1st Class
Infectious Mononucleosis (glandular Fever)	H	GFT	**3ml EDTA**	
Influenza A/B	S	FLUA/B	**SST**	
Insulin	C	INS	**SST & Sodium Flouride**	Freeze. Sent to Guilford by courier
Insulin + C Peptide	C	INS/C	**SST**	Freeze. Sent to Guilford by courier
Insulin Growth Factor (Binding Protein 3)	C	INFBP3	**SST**	Freeze. Sent to Norfolk and Norwich
Insulin Growth Factor 1	C	INSGF1	**SST**	Freeze. Sent to Norfolk and Norwich
Intrinsic Factor Antibodies	H	IFA	**SST**	Sent to N&N by 1st class.
Investigations for Haemolytic Disease of the Newborn	XM	PG &CG & DAGT	**Capillary EDTA**	Refer to Trust Transfusion Policy
Iron Studies	C	FE	**SST**	Includes FER, TIBC,
Islet Cell Antibodies	IS	ICAB	**SST**	Sent 1st class to Sheffield
ISO enzymes (ALKISO)	C	ALKISO	**SST**	See ALK Phos ISO enzyme
ISO enzymes (CKMB)	C	CKISO	**SST**	
JAK 2	H	MOLEC	**2 x 6ml EDTA**	Sent to

				Addenbrookes by 1st class
Kaolin Cephalin Clotting Coagulation Time	H	KCCT	Citrate	Sent to Addenbrookes
Karyotyping	C		10ml Lithium Heparin	Refer to Chromosomes
Kleihauer Count	XM	K	EDTA 3ml	
Lactate	C	LACT	Sodium Fluoride	On Ice
Lactate Dehydrogenase	C	LDH	SST	See LDH
Lamotrigine	C	LAMO	SST	Sent to Hallamshire by 1st class
LDH	C	LDH	SST	Only for Haem and ONC consultants
Lead levels	C	LEAD	6ml EDTA	Do not separate. Sent to trace elements Guilford by 1st class
Lead Levels (urine)	C		24hr Urine	Sent to trace elements Guilford by 1st class
Legionella abs	S	NLEG	SST	
Legionella urinary antigen	S	NLEGU	**Urine**	Only first week of illness.
Leptin	IS	LEPT	SST	Sent to Addenbrookes by 1st class
Leptospira	S	NLEP	SST	
LH	C	LH	SST	See luitenizing Hormone
Lipase (Pancreatic)	IS		SST	
Lipids	C	TCHOL	SST	
Lipoprotein (APO)	IS		SST	
Lipoprotein A	IS		SST	
Lipoprotein EP	IS		SST	
Lithium	C	LI	SST	
Liver Function Tests	C	L	SST	

Long Chain Fatty Acids	C	LCVFA	**6ml EDTA**	Centrifuge, Separate and Freeze. Sent to Addenbrookes by 1st class
Lupus Screen	H	LUPUS	**Citrate x 3**	Not on Fridays. Sent to Addenbrookes by 1st class
Luteinizing Hormone	C	LH	**SST**	
Lymphocyte Markers	H	IMM	**10-20ml EDTA**	Sent to Addenbrookes same day
M Band (electrophoresis)	C	EP	**SST**	
Magnesium	C	MAG	**SST**	
Malaria	H	MS	**3ml EDTA**	Straight to Haem
Manganese	C		**SST or Urine**	
Markers	S		**SST**	
MC&S (blood)	Bacti		**Blood culture bottles**	Refer to Specific venepuncture SOP
MC&S (urine)	Bacti		**Universal Urine**	
Measles IgM	S		**SST**	
Measles virus RNA	S		**6ml EDTA**	
Meningococcus PCR	S	PCR	**6ml EDTA**	Stored pending blood culture result.
Mercury	C	HG	**EMU/ 6ml EDTA**	
Met Haemoglobin	H	METHB	**Lithium Heparin**	Straight to lab
Methotrexate	C	METHO	**SST** NOT FOR ROUTINE USE	For high dose chemotherapy patient, only by special arrangement ⃠ Sent to Addenbrookes same day by courier
Microalbumin	C	ACR	**Urine Universal**	
Molecular JAK mutation	H	MOLEC	**2x 6ml EDTA**	Sent to Addenbrookes by 1st class
Mucopoly saccharides	C	UMUC	**EMU**	Random. Freeze. Sent to

				Addenbrookes by 1st class
Mumps IgM	S		SST	
Mumps Virus RNA	S		6ml EDTA	
Mycoplasma Antibodies	S		SST	
Myeloma Screen	C	EP/BJP	SST / universal urine	Refer to EP/BJP
Myeloma Trial (Birmingham)	H	MMB	Clotted (20ml), Universal urine	Comes accompanied by a letter
Myoglobulin	H	UMYO	**Urine**	Universal Supplied by Haem containing bicarbonate
Neonatal Alloimmune Thrombocytopenia NAITP	XM	SPI	Refer to Transfusion for request form	Must be in time to go to NBS same day Telephone to discuss
Neurone Specific Endase	IS		SST	Sent 1st Class to Sheffield
Neurotensin	C	GAST		See Gastrin
Nickel	C		Universal Urine	Random Sample
NMDA	IS	NMDA	SST	Only for Neurologists sent 1st class to Oxford
N-MethylD-aspartimine receptor abs (NMDA)				See NMDA
Non Haemolytic Febrile Transfusion Reaction	XM	SPI	**EDTA (10-15ml)** Clotted (10-15ml)	Must be in time to go to NBS same day
NSE	IS		SST	See Neurone Specific Endase
Occult Blood	C	FOB	**Faeces**	
Oestradiol	C	E2	SST	
Oligoclonal banding	C	CSFP	SST	Sent to Queens Square by 1st class
Organic Acids	C	UORGAN	**Urine Universal**	Random Sample. Sent to Addenbrookes by 1st class

Orosomucoids	C	OROSO	SST	
Osmolality (blood)	C	OSMO	SST	
Osmolality (Urine)	C	UOSMO	**Urine Universal**	
Oxalate (urine)	C	UOXA	**24hr urine**	20mLs aliquot (50 mLs 2.5$_N$ HCIL)
P.carinii PCR	S		**Saline induced Sputum**	
P. Mets	C		**3x 6ml EDTA**	Centrifuge, freeze sent to addenbrookes by courier/transport tin
Pancreatic Polypeptide	C	GAST		See Gastrin
Paracetamol	C	PARA	SST	
Parainfluenza	S		SST	
Parathyroid hormone	C	SPTH	SST	UnCuffed
Parietal Cell Antibodies	IS	APCA	SST	
Parovirus B19	S	PAR	SST	
Paul Bunnell	S		SST	
PCR testing	S	PCR	**6ml EDTA**	State which organism required
Pemphigoid/pemphigus abs	IS	PEAB	SST	Sent 1st class to Sheffield
PEP	C	EP	SST	Also Known as Protein Electrophoresis
PET (Pre eclamptic toxaemia)	C		SST	
Phenobarbitone	C	PHENO	SST	
Phenytoin	C	PHENY	SST	
Phosphate (blood)	C	PO4	SST	
Phosphate (urine)	C	UPHOS	**24hr urine**	
PIII NP	C	PIIINP	SST	⊘ Sent to Kings College by 1st class
PIVKA & VIT K	H	PIVKA	**Clotted**	Keep in Dark. Sent to St Thomas by 1st class
Picornavirus	S		SST	
Plasma Metadrenaline	C		**3x 6ml EDTA**	Centrifuge, freeze sent to addenbrookes by

				courier/transport tin
Plasma Norametadrenaline	C		**3x 6ml EDTA**	Centrifuge, freeze sent to addenbrookes by courier/transport tin
Plasma Viscosity	H	PVA	**6ml EDTA x 2**	*Do not send high risk specimens*. Sent to Addenbrookes by 1st class
Platelet Count	H	FBC	**3ml EDTA**	May require a citrate/thromboexact tube as well if requested.
Platelet Immunology	XM		Refer to Transfusion for request form	01223-54 8034/8020
Platelet refractoriness / HLA Antibody Screen	XM	SPI	Refer to Transfusion for request form	Must be in time to go to NBS same day
Platelet Studies	H	PLAGGS	**10ml Citrate**	Sent Immediately to Addenbrookes via taxi/courier
Pneumococcal PCR	S		**6ml EDTA**	
Pneumocystis	S	PC	Saline induced sputum minimum requirement	
Polyomavirus BK DNA	S		Urine	
Polyomavirus JC DNA	S		Urine	
Polypeptide VIP	C	GAST		See Gastrin
Porphobilinogen	C	UPOBIL	24hr urine	
Porphyrins	C	QPORPH	**5-10ml EDTA**	Keep in dark. Also faeces (~5g) & urine (20ml) Sent to edford by 1st class
Post Transfusion Purpura	XM		Refer to Transfusion for request form	Must be in time to go to NBS same day
Potassium (blood)	C	K	**SST**	
Potassium (urine)	C	UK	**24hr Urine**	
Pre eclampsia test (PET)	C		**SST**	
Private Blood Groups (eg Speedway	XM	G	**6ml EDTA**	

Riders)				
Progesterone	C	PROG	SST	
Prolactin	C	PROL	SST	
Prostate Specific Antigen	C	PSA	SST	
Protein C Level	H	PROTC	Citrate x 3	Part of Thrombophilia Screen
Protein S	H	PROTS	Citrate x 3	Part of Thrombophilia Screen
Prothrombin Time	H	WC	Citrate	
Pseudomonas abs	S		SST	
Pyruvate Dehydrogenase (PDH/M2)	IS	LIV (M2)	SST	Only if AMA+, sent to Birmingham 1st class
Red Cell Folate	C	RCF	3ml EDTA x 2	Only after abnormal serum folate
Red Cell Immunohaematology	XM		Refer to Transfusion for request form	See Transfusion
Red Cell Markers	H	IMM	3ml EDTA x 2	Sent to Addenbrookes same day
Referred Coagulation	H	COAA	Citrate x 4	Sent to Addenbrookes by courier
Referred Malaria Parasites	H	MAL	2 x thick, 2 x thin blood films (fixed) + 3ml EDTA	Must have blue referral form filled in by medics. Sent to London Hospital. See SOP
Renal	C	R	SST	
Renal Calculus	C	STONE	**Renal Stone**	Sent 1st class to Birmingham
Respiratory Syncytial virus	S	RSV	NPA	
RETICS	H	RETIC	3ml EDTA	
Reticulocytes	H	RETIC	3ml EDTA	
Rhinovirus	S		**NPA**	

Rickettsial	S		SST	
Ristocetin Co Factor	H	RICOF	Citrate x 4	Sent to Addenbrookes same day
Ross River	S		SST	
RPR	S		SST	
RSV	S	RSV	**NPA**	
Rubella	S	RUB	SST	
Salicylate	C	SALS	SST	
SBR	C		SST	
Screening for HLA Class I Antibodies	XM	SPI	Refer to Transfusion for request form	Must be in time to go to NBS same day
Screening for HPA Antibodies	XM	SPI	Refer to Transfusion for request form	Must be in time to go to NBS same day
Second opinion Marrow/Blood Film Morphology	H	MORPHA	Bone Marrow Aspirate & Trephine slides, or Blood film	Sent to Addenbrookes by Interlink
Selenium	C	SE	SST	Sent to trace elements Guilford by 1st class
Sero-Conversion Hepatitis B (post vaccine)	S	AHBS	SST	
Serum Bilirubin	C		SST	
Serum free Light Chains	C	SFLC	SST	Sent to N& N
Sex Hormone Binding Globulin (SHBG)	C	SHBG	SST	Sent to N&N
Sezary Cells	H	FI	3ml EDTA	Less than 1hr old
Short Synacthen test	C	ACFT1		See Adrenal Suppression Test
Sickle Cell	H	HBS	3ml EDTA	Also book in for HBOP
Sirolimus	C	SIR	3ml EDTA	Sent to Harefield by 1st class
Skin reactive Antibodies	IS	PEAB	SST	Sent 1st class to Sheffield
SLE Screening	IS	ANF	SST	
Sodium Valporate	C	VALP	SST	

Somatostatin	C	GAST		See Gastrin
SPEP	C		SST	
Split Bilirubin	C		SST	
Streptococcal anti Deoxyribonuclease B	S		SST	
Subsets	H	SUBS	2x 3ml EDTA	Copy of FBC results. Sent to Addenbrookes by courier
Suxamethonium Sensitivity Reaction (See cholinesterase for Suxamethonium sensitivity	C	SUXTYP	SST + Sodium Fluoride	Cholinesterase for Genetic abnormalities
Sweat test	C	SWEAT		Contact Lab
Syphilis IgG/M	S	SYP	SST	
T & B Cell Quantitation	H	SUBS	2x 3ml EDTA	Copy of FBC results. Sent to Addenbrookes by courier
T. Pallidum	S		SST	
T spot	S		3 x Lith Hep	Must be sent to lab before 2pm mon-fri
Tacrolimus Levels	C	FK506	6ml EDTA	Sent to Kings College or Addenbrookes – refer to SOP
TAU proteins	C	TAUP	Nasal/ear secretions	Sent to St Georges
Teicoplanin levels	S		SST	
Testosterone	C	TEST	SST	Must state patients sex when booking in
TFT	C	TFT	SST	
TG	C	TG	SST	
Thalassemia Screen	H	HBOP	3ml EDTA	See Alpha thalassemia screen
Theophyline	C	THEO	SST	
Thiopurine Methyl Transferase	C	TPMT	6ml EDTA	⃠ Sent to St Thomas by 1st class
Thromboexact	H	FBC	3ml EDTA and	Form and both

			special thromboexact tube	samples to Haem
Thrombophilia Screen	H	TPSA	**Citrate x3**	⃠ Sent to Addenbrookes by 1st class
Thrombotest	H	INR	**Citrate** / Fingerprick	INR clinic
Thyroglobulins	C	THYRO	**SST**	Prerequisite TSH + FT4. sent to UHW by 1st class
Thyroid Antibodies	C	TPO	**SST**	
Thyroid Binding Globulin	C	TBG	**SST**	
Thyroid function test (TFT/TSH)	C	TFT	**SST**	
TIBC	C	TIBC	**SST**	
Tissue Typing (HLA)	H	HLA	**3x 6ml EDTA**	Sent to Addenbrookes by courier
Tobramycin	S	REFSER	**SST**	
Torch	S		**SST**	Full clinical details/dates required.
Total Iron Binding Capacity	C	TIBC	**SST**	
Toxocara abs	S		**SST**	
Toxoplasmosis	S	TOXO	**SST**	
TPMT	C	TMPT	**6ml EDTA**	⃠ Sent to St Thomas by 1st class
TPPA	S		**SST**	
TRAB	C	TRAB	**SST**	See Anti TSH receptor Abs
Transferrin	C	FE/TIBC	**SST**	
TRH	C	TRAB	**SST**	
Triglycerides	C	TG	**SST**	
Troph. Whippelii DNA	S		**6ml EDTA**	
Troponin I	C	TROPI	**SST**	
Tryptase – Mast Cell	C	TRYPT	**SST**	Sent to Hallamshire by 1st class

TSH	C	TFT	SST	
Tumour Marker (AFP & HCG)	C	TUM	SST	AFP & βHCG only sent if known testicular tumour. Sent to addenbrookes by 1st class
UK Myeloma Forum Elderly Study	H	REF	**EDTA (5ml), Clotted (10ml)** Universal **urine** Bone Marrow Aspirate slides unstained (2), 2ml bone marrow in heparinised tissue culture medium.	Telephone Guys to expect samples 0207 955 2031
Unconjugated/conjugated bilirubin	C		SST	
Unstable Haemoglobin	H	HBOP	3ml EDTA	Need age matched normal sample
Urates	C	UAC	SST	
Urea	C	UREA	SST	
Urine Drugs Abuse	C	UDRUGS	**Random Urine**	Sent to N&N by 1st class.
Urinary Cortisol (free)	C	24 CORT	**24hr urine**	20mL aliquot. Sent to Leeds by 1st class
Urinary Copper	C	UCUQ	**24hr urine**	Sent to Trace elements Guilford by 1st class
Urinary Human Chorionic Gonadotrophin (HCG)	H	HCG	Urine	Universal
Urinary Myoglobin	H	MYO	Universal + SST	Universal supplied by haem containing bicarbonate
Urinary Oxalate	C	UOXA	**24hr urine**	Sent to UCL by 1st class
Urinary Steroid Profile	C	UST	**24hr urine**	Sent to Kings college by 1st class
Urinary Metabolic Profile	C	UMETPR	**Random urine**	Freeze. Sent to addenbrookes by 1st class
Valproate	C	VALP	SST	
Vancomycin Levels	C		SST	Stat time of last dose and sample time.

Varicella Zoster (chicken pox)	S	VZG	**SST**	
Varicella Zoster Virus DNA	S		**CSF Sample**	
VDRL	S		**SST**	
Very Long Chain Fatty Acids	C	VLCFA	**6ml EDTA**	See Long Chain fatty acids
Viral Antibodies	S		**SST**	Full clinical details. Date of onset required
Viral culture	S	VC	Swab in virus transport	
Vitamin A & E	C	VITEA	**Lithium Heparin**	Protect from light. Centrifuge, freeze. Sent to Leeds by 1st class
Vitamin B1		THIA	**10 ml Lithium heparin**	⊘
Vitamin B_{12}	C	B12	**SST**	
Vitamin D	C		**SST**	
Vitamin E	C	VITE	**Lith/Hep & clotted**	Protect from light. Centrifuge, freeze. Sent to Leeds by 1st class
VMA/Creatine ratio	C	VCRE	**24hr urine**	20mLs aliquot
Von Willebrand Disease	H	VWD	**Citrate x 4**	Check with Lab as has to arrive at destination within the hour
Voriconazole			**SST**	
VZ	S	VZG	**SST**	See Varicella Zooster
Warfarin Control	H	WC	**Citrate**	No more than 4hrs old on receipt
White Cell Enzyme	C	WCE	**6ml EDTA**	Do not separate. Sent to Willink by 1st class
Zinc	C	ZN	**Clotted** (~2ml)	**DO NOT USE SST** CANNOT BE HAEMOLYSED SENT TO TRACE ELEMENTS GUILFORD

Appendix 2: Inadequately/Incorrectly labelled specimen policy

This policy deals with specimens or forms that are inadequately or incorrectly labelled.

Labelling Requirements.

Minimum and preferred labelling requirements are set out below:

Data	Sample	Form
Identifying data (Essential)	Minimum of 4 identifiers, e.g., full name and DOB	As below
	Full name, matching with the form	Full name, matching with the sample
	DOB and/or hospital or NHS number	DOB and/or hospital or NHS number
		Location/Destination for report and/or GP/Consultant name
Identifying data (Preferred)	Minimum of 4 identifiers, e.g., full name, DOB and one other	
	Date and time of collection	Date & Time of collection
	Location of origin	Clinical Information
		Sex
		Signature of requesting clinician
		Bleep number of requesting clinician
		Patients address (for GP requests)

Notes:

The patient's name will normally be a minimum of two parts, forename and surname. It is permissible, due to the restraints imposed by the space available on a specimen label for the requester to record any two parts of a hyphenated name, or to abbreviate individual names longer than 12 letters, e.g., Georgina Barclay-Humphreys may be abbreviated to Georgina Barclay on the specimen, similarly, Rajarajesuwari Subramanium may be abbreviated by shortening the first or surname to a total of 15 characters. These examples form guidelines, not absolute rules. If in doubt, please refer the matter to the Specimen Reception Supervisor or his/her deputy or a senior member of lab staff.

In the case of unidentified casualties (e.g., from RTA's), it is permissible to accept samples with a hospital number only, providing the sample and form are also identified as "Unknown Male/Female" and a tag number if more than one such person exists at the time.

Please note that from November 2010, all Trust samples MUST be labelled with labels generated by the PDA SafeTx system, except from areas with a prior agreement with the laboratory.

Incorrectly labelled specimens or forms.

An incorrectly labelled specimen is one that has the relevant labelling information supplied, but the information on the specimen and form do not match. In this case, the Reception Supervisor or his/her deputy is to be informed. The Supervisor/Deputy will be required to confirm which information is correct, that on the specimen or form. In order to do so, they must telephone the requester immediately, in the case of urgent samples, or at the first available opportunity for non-urgent requests (mid-morning break, lunch break, afternoon break, end of day). If the requester is able to confirm all of the labelling on the specimen is correct, but an error was made in completing the form, then the specimen may be processed, so long as a new request form is generated by the requester (delivered by hand for work on site or by fax from outside). It is not permissible for the Pathology staff to alter or correct any of the labelling on the form or specimen. If the requester refuses to provide a new request form, the matter should be referred to a senior BMS. If the requester confirms all details on the form as correct (hence, the sample data is incorrect), then a new sample must be requested. In the event of the requester insisting upon the analysis of the current incorrectly labelled sample, the matter should be referred to a senior BMS.

Appendix 3: Unlabelled Specimen Policy

This policy sets out the action to be taken by the Sample preparation staff in the event of receipt of unlabelled specimens or forms.

Unlabelled specimens

Unlabelled specimens are not processed unless they are unrepeatable, e.g., Histology/Cytology specimen or CSF. In the case of these samples, the sample preparation Staff should bring the sample to the attention of a senior member of the lab staff as soon as it is received. The senior BMS receiving this sample should endeavour to arrange for the sample to be labelled at the earliest convenient time, and ensure that the requester realises that the final results of this sample will be withheld until such time that the sample is labelled and compliant with the Pathology specimen reception policies.

With regard to all other samples, the Reception Supervisor or his/her deputy should be informed of the receipt of an unlabelled specimen as soon as it is received. If marked urgent, or if the request was generated by a department for which much of the work is urgent (A/E, MAU, ITU, SCBU, etc), the requester must be informed immediately. In the case of non-urgent samples, contact with the requester may be delayed for a short period of time. The Supervisor should telephone or page the requester and inform them that the sample is unlabelled, and that the Pathology policy forbids the processing of the sample or the labelling of the sample at this point. The requester should be clear that another sample would be required if the test results were still wanted. The original request form can be booked-in to the system and recorded as "Sample unlabelled, unable to analyse". The time and date of the telephone contact with the requester should be logged on the system, along with the details of the Supervisor or his/her Deputy.

All unlabelled specimens should be bagged with a copy of the original request form and stored in a refrigerator for a suitable period (minimum of 24 hours).
In case of complaint by the requester, they should be advised to speak to the relevant consultant in Pathology regarding the policy.

Unlabelled forms

In the event that a fully labelled specimen is received in the laboratory along with an unlabelled form, if the locator information can be gained from the specimen or deduced from the "company kept" by the specimen (e.g., arrived in tin from specific Health Centre), then the Supervisor should contact the likely requester location and confirm that the patient details are known to them. If confirmed, the Supervisor should request that a completed request form be faxed to the Reception to allow sample processing. If the patient is unknown to the requester

location, the sample and form should be bagged and stored in a refrigerator for a suitable period before discard (a minimum of 24 hours).

Appendix 4: Blood Sciences requests turnaround times

Test / Profile	Maximum turn round time
Routine Chemistry Serum/Urine/Fluids) FBC including film Urine HCG	**24 Hours**
Coagulation ESR Factor assays	**8 Hours**
Routine Endocrinology	**48 hours**
Special Endocrinology Immunoassay Haemoglobinopathys	**7 days**
Malarial Parasites	**2 Hours**
Referred Tests	**Phone laboratory ext 4255**

Appendix 5: Blood Sciences samples special considerations

Haemolysis releases cell contents into the plasma/serum.

The differential concentration across cell membranes is maintained by the energy from glycolysis. In vitro erythrocytes use up glucose and therefore the energy source and so concentration in plasma/cells will equalise. So if the plasma is not separated from the cells within 4 hours similar effects to that of haemolysis is observed.

Hormones, enzymes and antigens are proteins and start to denature soon after venepuncture and subsequent separation. So unstable proteins should be stored at recommended temperature e.g.

Thyroid short term 4°C. long term 20°C

Enzymes short term 4°C. long term 20°C

PSA immediate -20°C

Specimens must be allowed to reach room temperature before assaying as most are performed at 24-37°C.

Visual Tests of Samples

1 **Haemolysis:** depending on the degree of haemolysis in the sample, may lead to Falsely raised K+, and Bilirubin.

2 **Lipaemia:** can cause low sodium due to "space occupying effect" and interferences with several assays.

3 **Icteric:** high bilirubin

4 **Cryoglobulins:** proteins that precipitate when cooled below body temperature may be associated with disease know to produce paraproteins. Occasionally if concentrations are high and precipitation is above 22°C, there may be skin lesions (Purpura and Raynaud's).

Influences of Age, Gender and Race

1 **New born:** bilirubin rises and peaks at day 5.

Glucose is low due to low glycogen reserves and adrenal immaturity.

Urea falls after birth as infant syntheses protein. Urea increases when tissue catabolism increases.

2 **Childhood to puberty:** ALP is high in children as its main source is from bone.

3 **Adult to elderly:** creatinine is increased due to renal damage.
urea is increased due to renal damage.

4 **Gender:** men have higher ALK, ALT, CK due to increased muscle mass. Fertile women have lower iron due to menstrual loss.

Full Blood count samples taken in EDTA are stable for 24hrs if kept at 4°C. Samples should not be exposed to extremes of heat. Samples are best stored at 4°C before transportation to the laboratory. Short samples may contain clots and provide unreliable results, overfilled samples may also clot.

Coagulation samples should always be sent filled correctly. Short samples will provide inaccurate results and will be discarded. Haemolysed Coagulation samples will cause contact inititiation of the coagulation cascade resulting in short, inaccurate time. Sample for D – Dimer cannot be processed. All samples for coagulation should be processed within 4 hours of venepuncture.

ESR samples bottles must always be correctly filled, otherwise anticoagulant dilution will cause inaccurately high results.

Appendix 6: Instructions for transportation of samples

Sample Deliveries
All samples delivered to the laboratory reception area must be in the correct sealed packaging, if not they will be disposed of in the appropriate manner.

All samples should be labelled correctly and placed inside the request form leak-proof specimen carrier (sample transit bag).
Please do NOT remove the absorbent paper insert found inside the specimen carrier bag as this is in place to minimise any spills from the samples.
All samples should then be placed in the large plastic bag labelled 'Pathology Diagnostic Specimens Handle with Care'; the bags are colour coded by individual department. This should then be passed on to the Driver from the Queen Elizabeth Hospital who will then transport the samples to the hospital. If the large metal carrier tins are available, the samples, in the appropriate carrier bag may be used.
Please ensure that sample container caps are screwed on tight, and the samples securely sealed in its transport bag.

If any leakage or damage to samples occur, follow your recommended guidelines for safe disposal. Advice may also be sought from the laboratory reception on 01553 613769, who will then pass you on to the relevant department for assistance.

Hospital drivers collect the samples from GP surgeries at regular times and bring them direct to the reception area at: -
Town Surgeries approx 10:00, 14:00 and 16:00
Country Surgeries approx 14:00
Coastal Surgeries approx 14:00
Wisbech Surgeries and Hospital approx 11:00,14:00,16:00 and 18:00.
Pathology reception will be notified if for any reason the drop time alters.

Porters deliver samples, from the wards, throughout the day to the sample tray located at the sample reception window.

Sandringham Hospital samples delivered by their porter must be checked for three points of identification on all samples and forms before accepting them. The forms must be date stamped.

On receipt of RAF Marham samples, any result reports can be returned with the driver.

Sample Distribution

All Samples received will be sorted and distributed to the correct area of Pathology as soon as possible after receipt.

Appendix 7: Referred Laboratories details

See also Microbiology policy for sample referral.

	CPA Number	CPA Cert	EQA Staus	PUP letters	TAT
Addenbrookes					
Vit D	O244	Yes	Registered	No	2 Weeks
Samino	O244	Yes	Registered	No	5 Working days
Uamino	O244	Yes	Registered	No	5 Working days
Free/total PSA	O244	Yes	Registered	No	5 Days
Bitotinidase	O244	Yes	Not Registered	No	5 Working days
FK506	O244	Yes	Registered	No	24 Hours TAT
TUMS	O244	Yes	Registered	No	3 Working days
Urine Cystine	O244	Yes	Registered	No	10 Working days
Long chain Fatty Acid	O244	Yes	Registered	No	10 Working days
Feacel Elastase	O244	Yes	Not Registered	No	10 Working days
Cyclosporine	O244	Yes	Registered	No	24 Hours TAT
Plasma Viscosity	O244	Yes	Registered	No	Not stated
Urine Muccopolysaccharides	O244	Yes	Registered	No	10 Working days
Cytogenetics					
Chromosomes for Adults and Children	1275	Yes	Registered	No	8 week reporting time and 2 weeks where mutation Is known
Cytogenetic Chromosomes	1275	Yes	Registered	No	8 week reporting time and 2 weeks where mutation Is known
DNA Fragile X	1275	Yes	Registered	No	8 week reporting time and 2 weeks where mutation Is known
Leukaemia					
Immunophenotyping	O466	Yes	Registered	No	1/2 Days
Jak 2	O466	Yes	Registered	No	1/2 Days
Moelcular	O466	Yes	Registered	No	1/2 Days
Cytogentics	O466	Yes	Registered	No	1/2 Days
Morphoroloy	O466	Yes	Registered	No	1/2 Days
CSF analysis	O466	Yes	Registered	No	1/2 Days
Coagulation Deparment					
Lupus	O466	Yes	Registered	No	Urgent 3 hrs if not 14 days
Thromophilla	O466	Yes	Registered	No	Urgent 4 Hrs if not 14 Days
VWD	O466	Yes	Registered	No	Urgent 5 Hrs if not 14 Days
Tissue Typing					
HLA B27	1091	Yes	Registered	No	14 Days

Bedford					
Pophorin	O352	Yes	Registered	No	Not stated
Central Middlesex Hospital					
Haemoglobinopathy	1018	Yes	Registered	No	within 14 days but could be longer
Charing Cross Hospital					
Calcitonin	1050	Yes	Registered	No	Over 7 Days
Gastrin	1050	Yes	Registered	No	Over 7 Days
Gut Hormones	1050	Yes	Registered	No	Over 7 Days
Hallamshire (sheffield)					
C1IN	O113	Yes	Registered	No	7/14 Days
Typtase	O113	Yes	Registered	No	7 days
A1AT phenotype	O113	Yes	Registered	No	7 days
CAD	O113	Yes	Registered	No	7 days
Funcab	O113	Yes	Registered	No	7/14 Days
GANG	O113	Yes	Registered	No	14 Days
Gad	O113	Yes	Registered	No	7/14 Days
Subclasses	O113	Yes	Registered	No	7/14 Days
Icab	O113	Yes	Registered	No	7/14 Days
Myag	O113	Yes	Registered	No	7/14 Days
Aspergillus	O113	Yes	Registered	No	7 days
Avain	O113	Yes	Registered	No	7 days
Guildford					
Insulin	1167	Yes	Registered	No	7/14 Days (assayed on Weds & Friday)
c-peptide	1167	Yes	Registered	No	7/14 Days (assayed on Weds & Friday)
IGF1 BP3	1167	Yes	Registered	No	7 Days
Kings College Hospital					
Erthropoietin	1245	Yes	Registered	No	3/5 Working Days
PIIINP	1245	Not sent (ACC)	Registered	No	Not stated
Tacro	2321	Not sent (ACC)	Registered	No	24hr hours of reciept
Urine Steroid Profile	1245	Yes	Registered	No	21 Days of reciept
Llandough Hospital					
Ethosuxamide	2141	Yes	Registered	No	7Days
clozapine	2141	Yes	Registered	No	7Days

Leeds
Vit EA

Norfolk and Norwich

ACTH	O868	Yes	Registered	No	Up to 7 Days (test done on a Tuesdat)
CA153	O868	Yes	Registered	No	Up to 4 Days (test done on Monday and Thursday)
HFE	O868	Yes	Registered	No	10/14 Days
HLA B27	O868	Yes	Registered	No	Upto 48hrs test run daily
IGF1	O868	Yes	Registered	No	Up to 7 days (tests done on a Tuesday)
IF	O868	Yes	Registered	No	Up to 7 Days
TT/NTP	O868	Yes	Registered	No	48 Hours
5HIAAQ	O868	Yes	Registered	No	Up to 7 Days
UDrugs	O868	Yes	Registered	No	3 Days
SFLC	O868	Yes	Registered	No	2 Weeks
SHBG	O868	Yes	Registered	No	2 weeks run on a Tuesday

Oxford

ACRA	1040	No	Registered	No	Not Stated.

Queen Square

CSF oligoclonal bands	1839	Yes	Registered	No	7 Days
tau protein	1839	Yes	None Available	No	6 Days

Royal Free Hospital

Amyloid A Protein	268	No	None Available		4Weeks
CKISO	268	Yes	None Available	None Available	3/4 weeks

SAS leeds

170hp	3057	Inspected Sept 2010	Registered	No	6 Days
Andro	3057	Inspected Sept 2010	Registered	No	19 Days
Dheas	3057	Inspected Sept 2010	Registered	No	10 Days

UCort		3057	Inspected Sept 2010	Registered	No	9 Days
Southmead Hospital						
Cholinesterase		OO34	Yes	Registered	No	3/4 Weeks
Suxamethonium		OO34	Yes	Registered	No	3/4 Weeks
Cholinesterase Genotyping		OO34	Yes	Not Registered	No	10/12 Weeks
St Marys						
Renin and Aldosterone		O563	Yes	Registered	No	3/4 Weeks
St Thomas Hospital						
Pivka11		O909	No	Registered	No	Not stated
TPMT		O909	No	Registered	No	Not stated
Trace elements Guildford						
Aluminum		1167	No but full ACC	Registered	No	Within 10 Working Days
Copper		1167	No but full ACC	Registered	No	Within 10 Working Days
Caeuloplasmin		1167	No but full ACC	Registered	No	Within 10 Working Days
Urinary Caeuloplasmin		1167	No but full ACC	Registered	No	Within 10 Working Days
Urinary Copper		1167	No but full ACC	Registered	No	Within 10 Working Days
Lead		1167	No but full ACC	Registered	No	Within 10 Working Days
Selenium		1167	No but full ACC	Registered	No	Within 10 Working Days
zinc		1167	No but full ACC	Registered	No	Within 10 Working Days
cobalt		1167	No but full ACC	Registered	No	Within 10 Working Days
chromium		1167	No but full ACC	Registered	No	Within 10 Working Days
University Hospital of Wales						
Thyroglobulin	O841		Yes	Registered	No	Not stated
University college London Hospital						
Urine Oxalate						
Willink Manchester						
White Cell Enzyme		2766	Yes	Registered	No	Not Stated

Reference: Audit of referral laboratories Jan 2011.

Appendix 8: Time constraints for additional tests (Blood Sciences)

Further tests on samples already received in the laboratory may be performed on receipt of the appropriate, and correctly filled in 'Additional request' form.

Further test requested	Time constraint (from receipt of sample)
Electrolytes	2 days
Glucose (SST)	3 hours
Liver	2 days
CRP	2 days
Cardiac (CK)	24 hours
Amylase	2 days
Bone profile	2 days
Haematinics (B12/Folate/Ferritin)	1 day
Thyroid Function	2 days
PSA	2 days
Oestradiol, Progesterone, Prolactin	2 days
Troponin I	2 days
Therapeutic Drugs	2 days
Paracetamol & Salicylate	1 day
Blood Film	12 hours
Glandular Fever Screen	2 days
Further Coagulation tests	4 hours
D Dimers	4 hours

Example Additional request form.

Blood Sciences Department. The Queen Elizabeth Hospital

Additional Test Request

Hospital N° ……

Surname ……

Forename ……

Sample N° CC ……..

Test Requested: ……..

Bleep No ……

Additional tests can only be requested if the sample N° is provided, and this completed form is sent to the laboratory with the next sample collection round or down the air tube, situated in MAU and A & E.

NHS *Department of Pathology*
Queen Elizabeth Hospital King's Lynn NHS Trust
Gayton Road
King's Lynn, Norfolk, PE30 4ET
01553 613430
01553 767742
http://www.qehkl.nhs.uk/gp.asp

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Grade of Doctor	Consultant / GP/ Registrar / SHO / HO (please delete not applicable)
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E-mail	
Phone	
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